Vol. 1183 Number 2

# OFFICIAL GAZETTE

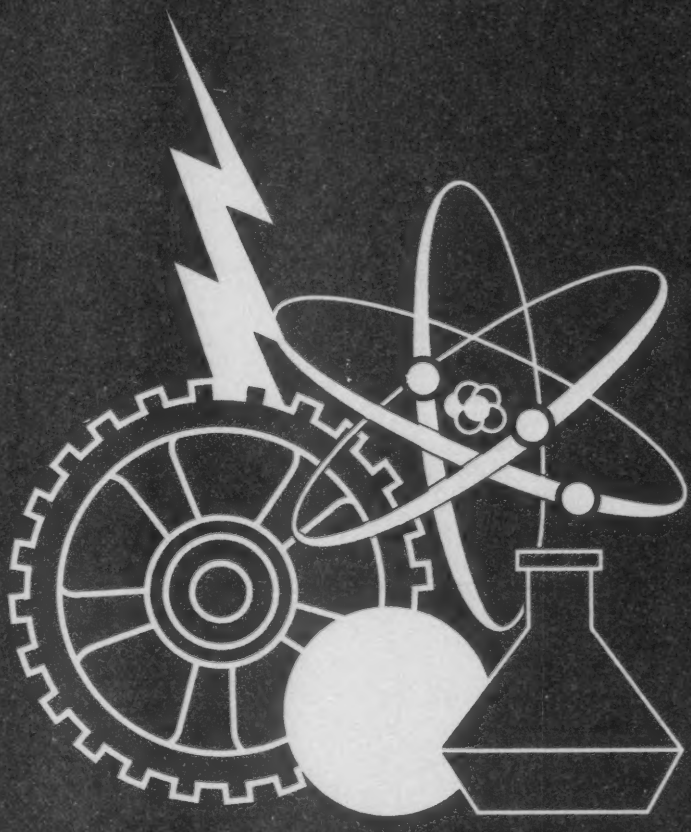
of the

## UNITED STATES PATENT AND TRADEMARK OFFICE

ute to:

PATENTS

February 13, 1996



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# OFFICIAL GAZETTE of the
# UNITED STATES PATENT AND TRADEMARK OFFICE

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# PATENT AND TRADEMARK OFFICE NOTICES

## Patent Cooperation Treaty (PCT) Information

For information concerning PCT member countries, see the notice appearing in the *Official Gazette* at 1181 O.G. 50, on December 19, 1995.

For use of the European Patent Office as an International Searching Authority for international applications filed in the United States Receiving Office, see the notice appearing in the *Official Gazette* at 1022 O.G. 52, on September 28, 1982.

For use of the European Patent Office as an International Preliminary Examining Authority for international applications filed in the United States Receiving Office, see the notices appearing in the *Official Gazette* at 1080 O.G. 2, on July 7, 1987, and at 1091 O.G. 2, on June 7, 1988. There is no longer a limit on the number of such international applications accepted for international preliminary examination by the European Patent Office; see the notice appearing at 1116 O.G. 32, on July 17, 1990.

The search fee of the European Patent Office was changed, effective June 20, 1995, due to a change in the exchange rate of the U.S. dollar with regard to the German mark, and was announced in the *Official Gazette* at 1181 O.G. 49, on December 19, 1995.

International fees were changed, effective on January 1, 1996, due to a change in the exchange rate of the U.S. dollar with regard to the Swiss franc, and were announced in the *Official Gazette* at 1181 O.G. 49, on December 19, 1995.

Certain domestic PCT fees and charges for International Search and Preliminary Examination were changed, effective October 1, 1995, and were announced in the *Official Gazette* at 1177 O.G. 171, on August 29, 1995.

The schedule of PCT fees (in U.S. dollars), effective January 1, 1996, is as follows:

| International Application (PCT Chapter I) fees: | |
|---|---|
| Transmittal fee | 220.00 |
| Search Fee | |
| U.S. Patent and Trademark Office (USPTO) as International Searching Authority (ISA) | |
| —No corresponding prior U.S. national application filed | 660.00 |
| —Corresponding prior U.S. national application filed | 430.00 |
| —Supplemental search fee, per additional invention (payable only upon invitation) | 190.00 |
| European Patent Office as ISA | 1700.00 |
| International fees | |
| Basic fee | 677.00 |
| Basic Supplemental fee (for each page over 30) | 13.00 |
| Designation fee per country or region | |
| —For the first 11 national or regional offices designated | 164.00 |
| —For each designation in excess of 11 offices | No Charge |
| Precautionary designation fee and confirmation fee for each precautionary designation confirmed (PCT Rule 15.5) | |
| —Designation fee | 164.00 |
| —Confirmation fee | 82.00 |
| International Application (PCT Chapter II) fees associated with filing a Demand for Preliminary Examination: | |
| Handling fee | 207.00 |
| Preliminary examination fee | |
| USPTO as International Preliminary Examining Authority (IPEA) | |
| —USPTO was ISA in PCT Chapter I | 470.00 |
| —Additional examination fee, per additional invention (payable only upon invitation) | 140.00 |
| —USPTO was not ISA in PCT Chapter I | 710.00 |
| —Additional examination fee, per additional invention (payable only upon invitation) | 250.00 |

| U.S. National Stage Fees | Small Entity | Regular |
|---|---|---|
| Basic National fee | | |
| USPTO was IPEA | | |
| —All claims presented satisfied provisions of PCT Article 33(2) to (4) | 47.00 | 94.00 |
| —All claims presented did not satisfy provisions of PCT Article 33(2) to (4) | 340.00 | 680.00 |
| USPTO was ISA but not IPEA | 375.00 | 750.00 |
| USPTO was neither ISA nor IPEA | | |
| —Search report has not been prepared by the European Patent Office or the Japanese Patent Office | 505.00 | 1010.00 |
| —Search report has been prepared by the European Patent Office or the Japanese Patent Office | 440.00 | 880.00 |
| Other National fees | | |
| —For each independent claim in excess of 3 | 39.00 | 78.00 |
| —For each claim in excess of 20 | 11.00 | 22.00 |
| —For each application containing a multiple dependent claim | 125.00 | 250.00 |
| —Surcharge for filing oath or declaration after the time limit applicable under PCT Article 22 or 39(1) | 65.00 | 130.00 |
| —Processing fee for filing English translation after the time limit applicable under PCT Article 22 or 39(1) | 130.00 | 130.00 |

Nov. 27, 1995

BRUCE A. LEHMAN
*Assistant Secretary of Commerce and Commissioner of Patents and Trademarks*

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## Notice of Maintenance Fees Payable

Title 37 Code of Federal Regulations (CFR), Section 1.362(d) provides that maintenance fees may be paid without surcharge for the six-month period beginning 3, 7, and 11 years after the date of issue of patents based on applications filed on or after Dec. 12, 1980. An additional six-month grace period is provided by 35 U.S.C. 41(b) and 37 CFR 1.362(e) for payment of the maintenance fee with the surcharge set forth in 37 CFR 1.20(h), as amended effective Dec. 16, 1991. If the maintenance fee is not paid in the patent requiring such payment the patent will expire on the 4th, 8th, or 12th anniversary of the grant.

Attention is drawn to the patents which were issued on February 09, 1993 for which maintenance fees due at 3 years and six months may now be paid. The patents have patent numbers within the following ranges:

Utility Patents 5,184,351 through 5,185,888
Reissue Patents based on the above identified patents.

Attention is drawn to the patents which were issued on February 07, 1989 for which maintenance fees due at 7 years and six months may now be paid. The patents have patent numbers within the following ranges:

Utility Patents 4,802,242 through 4,803,739
Reissue Patents based on the above identified patents.

Attention is drawn to the patents which were issued on February 05, 1985 for which maintenance fees due at 11 years and six months may now be paid. The patents have patent numbers within the following ranges:

Utility Patents 4,497,069 through 4,498,198
Reissue Patents based on the above identified patents.

No maintenance fees are required for design or plant patents.

Payments of maintenance fees in patents should be directed to "Commissioner of Patents and Trademarks, Box M. Fee, Washington, D.C. 20231."

For patents based on applications filed on or after Dec. 12, 1980, but before Aug. 27, 1982, patent owners must establish small entity status according to 37 CFR 1.27 if they have not done so and if they wish to pay the small entity amount.

The current amounts of the maintenance fees due at 3 years and six months, 7 years and six months, and 11 years and six months are set forth in 37 CFR 1.20(e)-(g), as amended Oct. 1, 1994, which are reproduced below:

37 CFR § 1.20 Post-issuance fees

(e) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Dec. 12, 1980, in force beyond 4 years; the fee is due by three years and six months after the original grant:

By a small entity (§ 1.9(f)) ..... $495.00
By other than a small entity ..... $990.00

(f) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Dec. 12, 1980 in force beyond 8 years; the fee is due by seven years and six months after the original grant:

By a small entity (§ 1.9(f)) ..... $995.00
By other than a small entity ..... $1,990.00

(g) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Dec. 12, 1980 in force beyond 12 years; the fee is due by eleven years and six months after the original grant:

By a small entity (§ 1.9(f)) ..... $1,495.00
By other than a small entity ..... $2,990.00

The amount of the surcharge for paying the maintenance fee during the grace period or after expiration of the patent are set forth in 37 CFR 1.20(h), and (i) which are reproduced below:

(h) Surcharge for paying a maintenance fee during the 6 month grace period following the expiration of three years and six months, seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Dec. 12, 1980:

By a small entity (§ 1.9(f)) ..... $65.00
By other than a small entity ..... $130.00

(i) Surcharge for accepting a maintenance fee after expiration of a patent for non-timely payment of a maintenance fee where the delay is shown to the satisfaction of the Commissioner to have been:

(1) unavoidable ..... $660.00
(2) unintentional ..... $1,550.00

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## Notice of Expiration of Patents Due to Failure to Pay Maintenance Fee

35 U.S.C. 41 and 37 CFR 1.362(g) provide that if the required maintenance fee and any applicable surcharge are not paid in a patent requiring such payment, the patent will expire at the end of the 4th, 8th or 12th anniversary of the grant of the patent depending on the first maintenance fee which was not paid.

According to the records of the Office, the patents listed below have expired due to failure to pay the required maintenance fee and any applicable surcharge.

*PATENTS WHICH EXPIRED December 13, 1995*
*DUE TO FAILURE TO PAY MAINTENANCE FEES*

| Patent Number | Serial Number | Issue Date |
|---|---|---|
| Re. 33,433 | 07/202,211 | 11/13/90 |
| (4,711,165) | (07/051,250) | (12/08/87) |
| Re. 33,560 | 07/447,387 | 03/26/91 |
| (4,712,232) | (07/035,517) | (12/08/87) |
| Re. 33,936 | 07/448,041 | 05/26/92 |
| (4,711,977) | (07/001,740) | (12/08/87) |
| Re. 34,261 | 07/686,270 | 05/25/93 |
| (4,711,269) | (06/756,845) | (12/08/87) |
| 4,419,772 | 06/338,884 | 12/13/83 |
| 4,419,783 | 06/377,691 | 12/13/83 |
| 4,419,784 | 06/271,091 | 12/13/83 |
| 4,419,792 | 06/332,012 | 12/13/83 |
| 4,419,798 | 06/245,744 | 12/13/83 |
| 4,419,801 | 06/226,099 | 12/13/83 |
| 4,419,804 | 06/268,331 | 12/13/83 |
| 4,419,814 | 06/311,568 | 12/13/83 |
| 4,419,832 | 06/346,452 | 12/13/83 |
| 4,419,838 | 06/390,057 | 12/13/83 |
| 4,419,845 | 06/246,704 | 12/13/83 |
| 4,419,851 | 06/286,163 | 12/13/83 |
| 4,419,852 | 06/269,048 | 12/13/83 |
| 4,419,858 | 06/315,411 | 12/13/83 |
| 4,419,864 | 06/301,655 | 12/13/83 |
| 4,419,869 | 06/458,986 | 12/13/83 |
| 4,419,879 | 06/312,107 | 12/13/83 |
| 4,419,886 | 06/332,243 | 12/13/83 |
| 4,419,889 | 06/248,374 | 12/13/83 |
| 4,419,891 | 06/332,252 | 12/13/83 |
| 4,419,892 | 06/284,280 | 12/13/83 |
| 4,419,894 | 06/289,434 | 12/13/83 |
| 4,419,896 | 06/296,852 | 12/13/83 |
| 4,419,898 | 06/311,523 | 12/13/83 |
| 4,419,899 | 06/360,420 | 12/13/83 |
| 4,419,901 | 06/361,526 | 12/13/83 |
| 4,419,913 | 06/294,686 | 12/13/83 |
| 4,419,918 | 06/343,091 | 12/13/83 |
| 4,419,920 | 06/396,360 | 12/13/83 |
| 4,419,921 | 06/385,509 | 12/13/83 |
| 4,419,922 | 06/241,615 | 12/13/83 |
| 4,419,933 | 06/307,633 | 12/13/83 |
| 4,419,934 | 06/289,294 | 12/13/83 |
| 4,419,935 | 06/456,507 | 12/13/83 |
| 4,419,939 | 06/235,145 | 12/13/83 |
| 4,419,944 | 06/319,213 | 12/13/83 |
| 4,419,948 | 06/376,313 | 12/13/83 |
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| 4,419,953 | 06/386,350 | 12/13/83 |
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| 4,419,968 | 06/403,977 | 12/13/83 |
| 4,419,976 | 06/246,894 | 12/13/83 |
| 4,419,977 | 06/379,401 | 12/13/83 |
| 4,419,985 | 06/361,466 | 12/13/83 |

| Patent Number | Serial Number | Issue Date |
|---|---|---|
| 4,419,992 | 06/233,725 | 12/13/83 |
| 4,419,995 | 06/303,547 | 12/13/83 |
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| 4,420,002 | 06/366,313 | 12/13/83 |
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| 4,420,026 | 06/311,956 | 12/13/83 |
| 4,420,039 | 06/309,887 | 12/13/83 |
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| 4,420,041 | 06/439,862 | 12/13/83 |
| 4,420,042 | 06/355,183 | 12/13/83 |
| 4,420,045 | 06/373,949 | 12/13/83 |
| 4,420,048 | 06/329,546 | 12/13/83 |
| 4,420,055 | 06/297,349 | 12/13/83 |
| 4,420,059 | 06/335,679 | 12/13/83 |
| 4,420,066 | 06/300,829 | 12/13/83 |
| 4,420,067 | 06/482,013 | 12/13/83 |
| 4,420,068 | 06/328,130 | 12/13/83 |
| 4,420,072 | 06/251,937 | 12/13/83 |
| 4,420,083 | 06/380,420 | 12/13/83 |
| 4,420,085 | 06/339,537 | 12/13/83 |
| 4,420,086 | 06/217,173 | 12/13/83 |
| 4,420,087 | 06/222,246 | 12/13/83 |
| 4,420,092 | 06/413,623 | 12/13/83 |
| 4,420,095 | 06/324,068 | 12/13/83 |
| 4,420,097 | 06/225,267 | 12/13/83 |
| 4,420,100 | 06/225,718 | 12/13/83 |
| 4,420,106 | 06/289,590 | 12/13/83 |
| 4,420,108 | 06/266,585 | 12/13/83 |
| 4,420,120 | 06/387,865 | 12/13/83 |
| 4,420,121 | 06/298,971 | 12/13/83 |
| 4,420,126 | 06/351,369 | 12/13/83 |
| 4,420,128 | 06/323,536 | 12/13/83 |
| 4,420,137 | 06/314,039 | 12/13/83 |
| 4,420,145 | 06/353,094 | 12/13/83 |
| 4,420,147 | 06/396,797 | 12/13/83 |
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| 4,420,157 | 06/349,363 | 12/13/83 |
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| 4,420,189 | 06/262,454 | 12/13/83 |
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| 4,420,202 | 06/301,149 | 12/13/83 |
| 4,420,207 | 06/263,507 | 12/13/83 |
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| 4,420,315 | 06/227,218 | 12/13/83 |
| 4,420,319 | 06/298,241 | 12/13/83 |
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| 4,420,323 | 06/376,489 | 12/13/83 |
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| 4,420,354 | 06/387,930 | 12/13/83 |
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| 4,420,357 | 06/350,552 | 12/13/83 |
| 4,420,362 | 06/420,441 | 12/13/83 |
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| 4,420,384 | 06/292,537 | 12/13/83 |
| 4,420,393 | 06/318,819 | 12/13/83 |
| 4,420,395 | 06/395,975 | 12/13/83 |
| 4,420,396 | 06/374,782 | 12/13/83 |
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| 4,420,403 | 06/404,635 | 12/13/83 |
| 4,420,408 | 06/265,676 | 12/13/83 |
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| 4,420,414 | 06/484,049 | 12/13/83 |
| 4,420,416 | 06/399,631 | 12/13/83 |
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| 4,420,444 | 06/328,623 | 12/13/83 |
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| 4,420,454 | 06/355,147 | 12/13/83 |
| 4,420,455 | 06/233,841 | 12/13/83 |
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| 4,420,463 | 06/350,508 | 12/13/83 |
| 4,420,464 | 06/314,611 | 12/13/83 |
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| 4,420,473 | 06/296,923 | 12/13/83 |
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| 4,420,482 | 06/322,855 | 12/13/83 |
| 4,420,485 | 06/424,379 | 12/13/83 |
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| 4,420,493 | 06/487,105 | 12/13/83 |
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| 4,420,504 | 06/378,585 | 12/13/83 |
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| 4,420,559 | 06/448,721 | 12/13/83 |
| 4,420,563 | 06/389,321 | 12/13/83 |
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| 4,420,570 | 06/417,260 | 12/13/83 |
| 4,420,571 | 06/397,896 | 12/13/83 |
| 4,420,576 | 06/287,913 | 12/13/83 |
| 4,420,583 | 06/391,659 | 12/13/83 |
| 4,420,584 | 06/258,817 | 12/13/83 |
| 4,420,587 | 06/423,903 | 12/13/83 |
| 4,420,589 | 06/423,731 | 12/13/83 |
| 4,420,594 | 06/349,872 | 12/13/83 |
| 4,420,597 | 06/306,777 | 12/13/83 |
| 4,420,606 | 06/434,683 | 12/13/83 |
| 4,420,607 | 06/475,567 | 12/13/83 |
| 4,420,608 | 06/327,605 | 12/13/83 |
| 4,420,609 | 06/311,935 | 12/13/83 |
| 4,420,610 | 06/459,065 | 12/13/83 |
| 4,420,614 | 06/300,191 | 12/13/83 |
| 4,420,616 | 06/236,945 | 12/13/83 |
| 4,420,620 | 06/325,449 | 12/13/83 |
| 4,420,622 | 06/380,757 | 12/13/83 |
| 4,420,623 | 06/358,957 | 12/13/83 |
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## Reissue Applications Filed

Notice under 37 CFR 1.11(b). The reissue applications listed below are open to inspection by the general public in the indicated Examining Groups and copies may be obtained by paying the fee therefor (37 CFR 1.12(b)).

**4,942,563**, Re. S.N. 08/553,928, Nov. 6, 1996, Cl. 369/44.11, SIGNAL PROCESSING APPARATUS AND METHOD CAPABLE OF PROVIDING PRECISE DIGITAL DATA, Mikio Yamamuro, Owner of Record: *Kabushiki Kaisha Toshiba, Kawasaki-Shi, Japan,* Attorney or Agent: David W. Hill, Ex. Gp.: 2513

**5,000,257**, Re. S.N. 08/561,588, Nov. 21, 1995, Cl. 165/140, HEAT EXCHANGER HAVING A RADIATOR AND A CONDENSER, Toshiharu Shinmura, Owner of Record: *Sanden Corp., Gumma, Japan,* Attorney or Agent: James G. Galto, Ex. Gp.: 3407

**5,059,976**, Re. S.N. 08/553,235, Nov. 7, 1995, Cl. 341, CODING METHOD OF IMAGE INFORMATION, Fumitaka Ono, et. al., Owner of Record: *Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan,* Attorney or Agent: David M. Driscoll, Ex. Gp.: 2104

**5,226,423**, Re. S.N. 08/501,810, July 13, 1995, Cl. 128/673, SENSOR GUIDE CONSTRUCTION AND USE THEREOF, Lar Tenerz, et. al., Owner of Record: *Radi Medical Systems AB, Uppsala, Sweden,* Attorney or Agent: Arthur Schwartz, Ex. Gp.: 3305

**5,236,902**, Re. S.N. 08/516,172, Aug. 17, 1995, Cl. 514/24, METHOD AND PROBES FOR DETECTING NUCLEOSIDE TRANSPORTER AND METHOD FOR PRODUCING THE PROBES, Alan R. P. Paterson, et. al., Owner of Record: *The Governors of the University of Alberta, Edmonton, Canada,* Attorney or Agent: Melissa B. Pendleton, Ex. Gp.: 1814

**5,257,956**, Re. S.N. 08/556,793, Nov. 2, 1995, Cl. 450/1, POST-MASTECTOMY GARMENT, Carol J. Ewen, Owner of Record: *Inventor,* Attorney or Agent: Lawrence M. Nawrocki, Ex. Gp.: 3408

**5,259,400**, Re. S.N. 08/551,587, Nov. 1, 1995, Cl. 131/238, SMOKELESS ASHTRAY, Robert H. Bruno, et. al., Owner of Record: *Pollenex Corp., Kansas City, Mo.,* Attorney or Agent: Michae P. Chu, Ex. Gp.: 3304

**5,260,454**, Re. S.N. 08/553,913, Nov. 6, 1995, Cl. 544/296, BIS-PYRIMIDYL THIOL SULFENIMIDE COMPOUNDS, Charles J. Rostek, Jr., Owner of Record: *Flexsys America L.P., Akron, Ohio,* Attorney or Agent: Gordon B. Seward, Ex. Gp.: 1202

**5,260,504**, Re. S.N. 08/557,391, Nov. 13, 1995, Cl. 84/297 R, STRING SUPPORT FOR STRINGED INSTRUMENT, William T. Turner, Owner of Record: *Inventor,* Attorney or Agent: Thomas S. Mac Donald, Ex. Gp.: 2101

**5,261,547**, Re. S.N. 08/557,458, Nov. 14, 1995, Cl. 215/233, METHODS AND COMBINATIONS FOR SEALING CORKED BOTTLES, Stephan J. Finke, Owner of Record: *Inventor,* Attorney or Agent: Todd A. Noah, Ex. Gp.: 3207

**5,273,502**, Re. S.N. 08/552,857, Nov. 3, 1995, Cl. 482/69, THERAPEUTIC UNLOADING APPARATUS AND METHOD, Douglas Kelsey, et. al., Owner of Record: *Soma, Inc., Austin, Tex.,* Attorney or Agent: H. Dale Langley, Jr., Ex. Gp.: 3302

**5,278,634**, Re. S.N. 08/556,028, Nov. 13, 1995, Cl. 356/400, HIGH PRECISION COMPONENT ALIGNMENT SENSOR SYSTEM, Timothy A. Skunes, et. al., Owner of Record: *Cyber Optics Corp.,* Attorney or Agent: Peter S. Dardi, Ex. Gp.: 2505

**5,284,491**, Re. S.N. 08/547,350, Oct. 24, 1995, Cl. 607/17, CARDIAC PACEMAKER WITH HYSTERESIS BEHAVIOR, Richard Sutton, et. al., Owner of Record: *Medtronic, Inc., Minneapolis, Minn.,* Attorney or Agent: Michael B. Atlass, Ex. Gp.: 3305

**5,325,780**, Re. S.N. 08/554,363, Nov. 6, 1995, Cl. 101/424, INK WASHING DEVICE FOR A PRINTING MACHINE, Fumio Matsuda, et. al., Owner of Record: *Sakurai Graphic Systems, Tokyo, Japan,* Attorney or Agent: Steve D. Beyer, Ex. Gp.: 3307

## Requests for Reexaminations Filed

Notice under 37 CFR 1.11(c). The requests for reexamination listed below are open to inspection by the general public in the indicated Examining Groups. Copies of the requests and related papers may be obtained by paying the fee therefor established in the Rules (37 CFR 1.19(a)).

In the event correspondence to the patent owner is not received, this notice will be considered to be constructive notice to the patent owner and reexamination will proceed (37 CFR 1.248(a)(5) and 1.525(b)).

**4,259,016**, Reexam. No. 90/004,084, Dec. 22, 1995, Cl. 356/350, INTERFEROMETER WITH SINGLE MODE WAVEGUIDE COIL, Gerhard Schiffner, Owner of Record: *LITEF Gmbh, Freiburg, Germany,* Attorney or Agent: John Simpson, Hill Van Santen Steadman & Simpson, Chicago, Ill., Ex. Gp.: 2505, Requester: Harold E. Gillmann, Litton Industries Inc., Woodland Hills, Calif.

**4,345,448**, Reexam. No. 90/004,083, Dec. 22, 1995, Cl. 070/095, CLOSURE ASSEMBLY WITH PROTECTIVE LOCK, Martin D. Solomon, Owner of Record: *Inventor,* Attorney or Agent: Mark S. Bioks, Roylance Abrams Berdo & Goodman, Washington, D.C., Ex. Gp.: 3508, Requester: Vincent Greco, Pelham Manor, N.Y., c/o Perry Teitelbaum, Goodman & Teitelbaum, Brooklyn, N.Y.

**4,354,760**, Reexam. No. 90/004,086, Dec. 22, 1995, Cl. 356/350, RING INFEROMETER COMPRISING A SINGLE-MODE LIGHT WAVEGUIDE, Gerhard Schiffner, Owner of Record: *LITEF Gmbh, Freiburg, Germany,* Attorney or Agent: John Simpson, Hill Van Santen Steadman & Simpson, Chicago, Ill., Ex. Gp.: 2505, Requester: Harold E. Gillmann, Litton Industries Inc., Woodland Hills, Calif.

**4,563,277**, Reexam. No. 90/004,087, Dec. 26, 1995, Cl. 210/220, APPARATUS FOR AERATING AND MIXING WASTE WATER, Charles E. Tharp, Owner of Record: *Environmental Dynamics, Inc., Columbia, Mo.,* Attorney or Agent: Richard R. Johnson, Kokjer Kircher Bowman & Johnson, Kansas City, Mo., Ex. Gp.: 1308, Requester: Daniel V. Thompson, Thompson & Thompson, Dallas, Tex.

**4,773,759**, Reexam. No. 90/004,085, Dec. 22, 1995, Cl. 356/350, INTERFEROMETER WITH KERR EFFECT COMPENSATION, Ralph A. Bergh, et. al., Owner of Record: *The Board of Trustees of the Leland Stanford Junior Univ., Stanford, Calif.*, Attorney or Agent: William H. Nieman, Knobble Martens Olson & Bear, Newport Beach, Calif., Ex. Gp.: 2505, Requester: Harold E. Gillmann, Litton Industries, Inc., Woodland Hills, Calif.

**4,900,320**, Reexam. No. 90/004,088, Dec. 27, 1995, Cl. 604/387, SANITARY NAPKIN WITH PANTY GATHERING FLAPS, Sherilyn S. McCoy, Owner of Record: *McNeil-PPC Inc., Milltown, N.J.*, Attorney or Agent: Robert L. Minier, Johnson & Johnson, New Brunswick, N.J., Ex. Gp.: 3308, Requester: Virgil H. Marsh, Fisher Christen & Sabol, Washington, D.C.

**5,012,373**, Reexam. No. 90/004,089, Jan. 17, 1996, Cl. 354/485, LENS SHUTTER TYPE OF CAMERA INCLUDING ZOOM LENS, Susao Nakamura, et. al., Owner of Record: *Asahi Kogaku Kogyo Kabushiki Kaisha Tokyo, Japan*, Attorney or Agent: Bruce H. Bernstein, Greenblum & Bernstein, Reston, Va., Ex. Gp.: 2101, Requester: Owner

**5,043,299**, Reexam. No. 90/004,070, Nov. 17, 1995, Cl. 437/192, PROCESS FOR SELECTIVE DEPOSITION OF TUNGSTEN ON SEMICONDUCTOR WAFER, Mei Chang, et. al., Owner of Record: *Applied Materials, Inc., Santa Clara, Calif.*, Attorney or Agent: Robert J. Stern, Applied Materials, Santa Clara, Calif., Ex. Gp.: 1104, Requester: Owner

**5,409,148**, Reexam. No. 90/004,081, Dec. 20, 1995, Cl. 222/402.1, SPRAY TEXTURING APPARATUS AND METHOD WITH DISPENSING TUBE, Donald J. Stern, et. al., Owner of Record: *DJS & T, Bellingham, Wash.*, Attorney or Agent: Michael R. Schacht, Hughes Multer & Schacht, Bellingham, Wash., Ex. Gp.: 3104, Requester: Owner

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## Notice of Expiration of Trademark Registrations Due To Failure to Renew

15 U.S.C. 1059 provides that each trademark registration may be renewed for periods of ten years from the end of the expiring period upon payment of the prescribed fee and the filing of an acceptable application for renewal. This may be done at any time within six months before the expiration of the period for which the registration was issued or renewed, or it may be done within three months after such expiration on payment of an additional fee.

According to the records of the Office, the trademark registrations listed below are expired due to failure to renew in accordance with 15 U.S.C. 1059.

### TRADEMARK REGISTRATIONS WHICH EXPIRED NOVEMBER 06, 1995 DUE TO FAILURE TO RENEW

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## Patents Available For License or Sale

08/280,367 "MED-BLOCKERS" OPTHALMIC TREATMENT AID FOR GLAUCOMA PATIENTS. (NON-INVASIVE)

Contact: Carmen Faranda Jr.
7295 Trenton Drive
Ravenna, Ohio 44266
(voice): (216) 296-3022

08/445,104 OUTDOOR SURVIVAL GARMENTS PHOTOVOLTEC SOLAR ELECTRICALLY HEATED WITH EMERGENCY SIGNAL LIGHTS AND ETC.

Contact: Mrs. Miriam Kea
114 Barksdale Rd.
Hampton, Va. 23669
(voice): (804) 723-0334
(fax): (804) 727-0329

4,423,523 OVERLAPPING BIBS ON A STRIP

Contact: B. Liebmann
3 Cumberland Ct.
Annapolis, Md. 21401
(voice): (410) 263-1434
(fax): (410) 992-3536

4,616,738 DAMPED BORING BAR AND TOOL HOLDER

Contact: Norval E. Shurtliff
910 1st
P.O. Box 122
Haines, Oreg. 97833
(voice): (541) 856-3288

5,098,223 GUTTER FERRULE

Contact: Mr. Mittelstaedt, III
Shermeta, Chimko & Kilpatrick, PC
P.O. Box 5016
Rochester Hills, Mich. 48308-5016
(voice): (810) 652-8200
(fax): (810) 652-1292

5,144,897 SHIPPING PACKAGE COMBINATION

Contact: Jim De Cesare
Dow Corning Corporation
Patent Department-CO1232
Midland, Mich. 48684-0994
(voice): (517) 496-4235
(fax): (517) 496-6354

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**Registration To Practice**

The following list contains the names of persons who successfully passed the registration examination that was held May 3, 1995 and have been given provisional recognition pursuant to 37 CFR 10.9(a) to prepare and prosecute patent applications before the Office until their registration certificates are mailed to them. Final approval for registration is subject to establishing to the satisfaction of the Director of the Office of Enrollment and Discipline that the person seeking registration is of good moral character and repute. [37 CFR 10.7(a)]. Accordingly, any information tending to affect the eligibility of any of the following applicants on moral, ethical, or other grounds should be furnished to the Director, Office of Enrollment and Discipline on or before March 29, 1996.

Altera, Allan G., 5031 Wickford Way, Dunwoody, Ga. 30338
Barone, Sarah, 328 Walnut St., San Francisco, Calif. 94118
Burbach, Stephen D., 1220 Lyndon St., #2, S. Pasadena, Calif. 91030
Calhoun, Joseph Davidson, III, 3007 Painted Valley Dr., Little Rock, Ariz. 72212
Casey, Michael Raymond, 1909 Hyannis Ct., #104, McLean, Va. 22102
Craig, Paula L., 2303 N. 10th St., #201, Arlington, Va. 22201
Dobson, Kevin S., 60 Parsley Ct., Lake Jackson, Tex. 77566
Duffy, John Fitzgerald, 1701 N. Kent St., #805, Arlington, Va. 22209
Haislmaier, Jason Daniel, 14 White Street, Concord, N.H. 03301
Holowach, Nicholas L., II, 6030 California Circle, #109, Rockville, Md. 20852-4837
Hoover, Kenley Kurt, 324 Frank Avenue, Mamaroneck, N.Y. 10543
Hunt, James Bernard, 960 Spring Rd., Elmhurst, Ill. 60126
Inouye, Patrick Joseph Sus, 500 S. Los Robles Ave., #210, Pasadena, Calif. 91101
Jordan, Kevin Michael, 22 Ash Rd., Briarcliff Manor, N.Y. 10510
Keenan, Jeffrie J., 32 Highland Ave., Bala Cynwyd, Pa. 19004
Kovach, Karl David, 233 E. Wacker Dr., #1513, Chicago, Ill. 60601
Mattingly, Todd D., 8787 Woodway Dr., #9111, Houston, Tex. 77063
McConwell, Edward Ambrose, Jr., 2919 W. 48th St., Westwood, Kans. 66205
McKinley, Douglas Edouard, Jr., 2610 W. 37th Ave., Kennewick, Wash. 99337
Merritt, Lisa G., 28 Warren St., #7, Concord, N.H. 03301
Morioka, Leslie, 7 Nuvern Ave., Mt. Vernon, N.Y. 10550
Phillips, Rob Lee, 1 Placed Harbor, Dana Point, Calif. 92629
Robbins, Steven J., 140 W. Kalmia St., #203, San Diego, Calif. 92101-1446
Rutledge, Karen McNamara, 21 Fairland St., Lexington, Mass. 02173
Sayeedi, Stephen A., 670 13th Ave., Salt Lake City, Utah 84103
Wunderlich, Lisa J., 3316 N. Southport, #1F, Chicago, Ill. 60657
Wurst, John, 465 Oak St., #304, Glendale, Calif. 91204

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**Service by Publication**

A petition to cancel the registration identified below having been filed, and the notice of such proceeding sent by certified mail to registrant at the last known address having been returned by the Postal Service as undeliverable, notice is hereby given that unless the registrant listed herein, its assigns or legal representatives, shall enter an appearance within thirty days of this publication, the cancellation will proceed as in the case of default.

Dollar World, Fresno, Calif., Reg. No. 1,652,105 for the mark VICKI LYNN, Canc. No. 24,503.

JEAN BROWN
*Technical Support Manager,*
Trademark Trial
and Appeal Board, for
ROBERT M. ANDERSON
*Deputy Assistant Commissioner*
*for Trademarks*

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**37 CFR 1.47 Notice by Publication**

Notice is hereby given of the filing of applications identified below with petitions under 37 CFR 1.47 requesting acceptance of the applications without the signature of all inventors. The petitions have been granted. A notice has been sent to the last known address of each of the non-signing inventors. The non-signing inventors may join in the application by promptly filing an appropriate oath or Declaration complying with 37 CFR 1.63.

| Application No. | Filing Date | Non-Signing Inventor | Title of Invention |
|---|---|---|---|
| 29/018,733 | Feb. 14, 1994 | Andrew P. Somerville | Soap Holder |
| 29/032,622 | Dec. 22, 1994 | Rosemary W. Wright | Sole Design |
| 08/130,740 | Oct. 1, 1993 | Mrs. Fonseca (legal representative) | Inbred Com Plant AQA3 |
| 08/135,778 | Oct. 12, 1993 | Henry E. Huey | Time Domain Algebraic Encoder/Decoder |
| 08/263,660 | June 21, 1994 | Waclaw Hamerlinski | Apparatus For The Extraction Of Peat |
| 08/292,432 | Aug. 17, 1994 | Wade Bowers | Coatings For Vinyl And Canvas Particularly Permitting Ink-Jet Printing |

| | | | |
|---|---|---|---|
| 08/298,996 | Aug. 31, 1994 | Ghosn S. Ziady | Multi-Drawer Cabinet Having A Drawer Lock-Out Mechanism |
| 08/300,302 | Sept. 2, 1994 | Keith R. Barraclough | Video Communication Apparatus |
| 08/321,613 | Oct. 12, 1994 | Annick Ballay | Expression In Non-Tumoral Human Lymphoblastoid Lines With An Integrative Vector |
| 08/325,659 | Oct. 18, 1994 | Roger L. Lallone | Antibodies Against An Intracellular Matrix Complex And Their Use In The Detection Of Cancer |
| 08/351,170 | Nov. 30, 1994 | David Campbell | Window Frame Assembly |
| 08/404,822 | Mar. 14, 1995 | Robert S. Frantz, Michael J. Wild | Improved Singulator Assembly |
| 08/422,509 | Apr. 13, 1995 | George A. Rakuljic, Victor Leyva | Fabrication And Applications Of Long-Lifetime, Holographic Gratings In Photorefractive Materials |
| 08/455,402 | May 31, 1995 | Michael I. Mahar | Enhanced Drug Dispensing System |
| 08/460,664 | June 2, 1995 | Janet D. Melcher | Aqueous Coating Composition |
| 08/475,695 | June 7, 1995 | Michael J. Walk | Automated Spray Impregnation Process And Articles Produced Thereby |
| 08/481,552 | June 7, 1995 | Charles J. Arntzer | Vaccines Expressed In Plants |

## Certificate of Correction
## For Week of February 13, 1996

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| B1 4,571,365 | 5,300,826 | 5,391,617 | 5,425,641 | 5,439,808 | 5,450,285 | 5,456,679 | 5,463,596 |
| P. 09,269 | 5,317,965 | 5,395,915 | 5,426,328 | 5,439,821 | 5,450,382 | 5,456,835 | 5,464,078 |
| P. 09,275 | 5,320,853 | 5,397,305 | 5,426,456 | 5,439,842 | 5,450,781 | 5,456,929 | 5,464,157 |
| Re. 35,068 | 5,328,759 | 5,397,345 | 5,428,442 | 5,441,048 | 5,451,330 | 5,457,487 | 5,464,404 |
| D. 363,614 | 5,329,328 | 5,399,196 | 5,428,687 | 5,441,972 | 5,451,415 | 5,457,503 | 5,464,751 |
| D. 364,301 | 5,333,200 | 5,401,812 | 5,429,001 | 5,442,686 | 5,451,792 | 5,457,906 | 5,464,834 |
| 4,946,800 | 5,339,125 | 5,403,552 | 5,431,062 | 5,443,740 | 5,452,462 | 5,458,205 | 5,464,892 |
| 5,000,663 | 5,340,372 | 5,403,848 | 5,431,182 | 5,444,076 | 5,452,693 | 5,458,916 | 5,465,188 |
| 5,042,804 | 5,341,295 | 5,405,888 | 5,431,648 | 5,444,191 | 5,452,787 | 5,459,193 | 5,465,190 |
| 5,047,222 | 5,346,918 | 5,408,250 | 5,432,173 | 5,444,266 | 5,452,929 | 5,459,502 | 5,465,242 |
| 5,104,404 | 5,350,874 | 5,412,364 | 5,432,866 | 5,444,727 | 5,452,931 | 5,459,843 | 5,465,310 |
| 5,104,581 | 5,354,540 | 5,414,113 | 5,433,815 | 5,445,851 | 5,453,175 | 5,460,856 | 5,467,620 |
| 5,118,123 | 5,371,004 | 5,414,547 | 5,434,222 | 5,446,157 | 5,453,449 | 5,460,990 | 5,468,596 |
| 5,137,976 | 5,372,046 | 5,414,583 | 5,434,566 | 5,446,570 | 5,453,538 | 5,461,054 | 5,469,548 |
| 5,169,088 | 5,374,652 | 5,418,649 | 5,434,842 | 5,446,688 | 5,453,714 | 5,461,091 | 5,470,344 |
| 5,228,164 | 5,374,893 | 5,419,164 | 5,435,802 | 5,446,865 | 5,453,859 | 5,461,179 | 5,470,476 |
| 5,262,652 | 5,376,811 | 5,419,581 | 5,435,832 | 5,447,291 | 5,454,785 | 5,461,478 | 5,470,482 |
| 5,271,008 | 5,377,549 | 5,421,019 | 5,436,124 | 5,447,840 | 5,455,204 | 5,461,546 | 5,470,484 |
| 5,275,388 | 5,378,624 | 5,422,334 | 5,436,541 | 5,447,914 | 5,455,238 | 5,461,578 | 5,470,650 |
| 5,277,048 | 5,378,806 | 5,422,423 | 5,438,050 | 5,448,306 | 5,455,519 | 5,462,141 | 5,471,935 |
| 5,279,360 | 5,381,380 | 5,422,985 | 5,438,228 | 5,448,350 | 5,455,603 | 5,462,168 | |
| 5,280,793 | 5,386,476 | 5,423,417 | 5,438,356 | 5,448,844 | 5,455,610 | 5,462,565 | |
| 5,287,434 | 5,390,841 | 5,423,719 | 5,439,073 | 5,449,979 | 5,455,616 | 5,462,701 | |
| 5,288,496 | 5,391,544 | 5,423,930 | 5,439,496 | 5,450,110 | 5,455,881 | 5,463,273 | |

**Summary of Final Decisions**

**Issued by the**

**Trademark Trial and Appeal Board**

**November 6-10, 1995**

| Date Issued | Type of Case(1) | Proceeding or App'n No. | Party/Parties | Issue | TTAB Decision | Opposer's/ Petitioner's Mark and Goods/Services | Applicant's/ Respondent's Mark and Goods/Services | Mark and Goods Cited by Examining Attorney | Recommended for Publication |
|---|---|---|---|---|---|---|---|---|---|
| 11-9 | EX<br>EX | 74/279,461<br>74/279,462 | VIP Foods, Inc. | Section 6 Disclaimer Requirement (of words "CANTON" and "PEKING") | Refusals Affirmed in both cases | | "VIP CANTON" (and design) [frozen foods, namely, vegetables mixed with fruit] and "VIP PEKING" (and design) [frozen foods, namely, mixed vegetables] | | No |

(1)EX=EX PARTE APPEAL; OPP=OPPOSITION; CANC=CANCELLATION; CU=CONCURRENT USE; (R)=REQ. FOR RECONSIDERATION

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Special box designations should be used to allow forwarding of particular types of mail to the appropriate areas as quickly as possible. Such mail is forwarded to the appropriate area without being opened. Only the specified type of document should be placed in an envelope addressed to one of these special boxes. If any documents other than the specified type identified for each special box are addressed to that box, they will be significantly delayed in reaching the appropriate area for which they are intended.

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Washington, D.C. 20231

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| Box 313b | Petitions under 37 CFR 1.313(b) to withdraw a patent application from issue after payment of the issue fee and any papers associated with the petition, including papers necessary for filing a continuing application. |
| Box AF | Expedited procedure for processing amendments and other responses after final rejection. |
| Box Comments Patents | Public comments regarding patent related regulations and procedures. |
| Box DAC | Petitions decided by the Office of Petitions including petitions to revive and petitions to accept late payment of issue fees or maintenance fees. |
| Box DD | Disclosure Documents or materials related to the Disclosure Document Program. |
| Box FWC | Requests for File Wrapper Continuation Applications (under 37 CFR 1.62). |
| Box Interference | Communications relating to interferences and applications and patents involved in interference. |
| Box Issue Fee | All communications following the receipt of a PTOL–85, "Notice of Allowance and Issue Fee Due," and prior to the issuance of a patent should be addressed to Box Issue Fee, unless advised to the contrary. Assignments are the exception. Assignments should be submitted in a separate envelope and not be sent to Box Issue Fee. |
| Box M Fee | Correspondence related to a patent that is subject to the payment of a maintenance fee. |
| Box MPEP | Submissions concerning the Manual of Patent Examining Procedures. |
| Box Non-Fee-Amendment | Non-fee amendments to patent applications. (Use Box AF for responses after final rejection). |
| Box PATENT APPLICATION | New patent applications and associated papers and fees. |
| Box Patent Ext. | Applications for patent term extension. |
| Box PCT | Mail related to applications filed under the Patent Cooperation Treaty. |
| Box Provisional Patent Application | The filing of all provisional patent applications and any communications relating thereto. |
| Box Reconstruction | Correspondence pertaining to the reconstruction of lost patent files. |
| Box Reexam | Requests for Reexamination for *original* request papers *only*. |
| Box Sequence | Submission of diskette for biotechnical application. |
| Box SN | For fee and petitions under 37 CFR 1.182 to obtain date received and/or serial number for patent applications *prior* to the Office's standard notification (return postcard or the official "Filing Receipt," "Notice to File Missing Parts," or "Notice of Incomplete Application"). |

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| Box ITU FEE | Statements of Use (SOU's), and extension requests. |
| Box TTAB FEE | Oppositions, cancellation petitions, and ex parte appeals. |
| Box TTAB NO FEE | Interferences, motions, and extension requests. |
| Box STATUS NO FEE | Written status inquiries. |
| Box POST REG FEE | Affidavits, renewals, corrections, and amendments. |
| Box RESPONSES NO FEE | Responses to Examining Attorneys' Office actions and Post Registration actions. |

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| Box 3 | Mail for the Office of Personnel from NFC. |
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| Box 8 | All papers for the Office of the Solicitor *except* communications relating to *pending litigation and disciplinary proceedings*; papers relating to pending litigation in court cases shall be mailed only to Office of the Solicitor, P.O. Box 15667, Arlington, Virginia 22215 and papers relating to pending disciplinary proceedings before the Administrative Law Judge or the Commissioner shall be mailed only to the Office of the Solicitor, P.O. Box 16116, Arlington, Virginia 22215. |
| Box 9 | Coupon orders for U.S. patent and trademark copies. |
| Box 10 | Orders for certified copies of PTO documents. |
| Box 11 | Electronic Ordering Service (EOS). |
| Box 13 | Mail for the Employee and Labor Relations Division. |
| Box 14 | Mail directed to the APS Contracts Office. |
| Box 16 | Deposit Account Replenishment Checks. |
| Box 17 | Invoices directed to the Office of Finance. |
| Box 171 | Vacancy Announcement Applications. |
| Box Assignment | All assignment documents except those filed with new applications. |
| Box EEO | Mail for the Office of Civil Rights. |
| Box OED | Mail for the Office of Enrollment and Discipline. |

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The following libraries, designated as Patent and Trademark Depository Libraries (PTDLs), receive patent and trademark information in various formats from the U.S. Patent and Trademark Office. Many PTDLs have on file all full-text patents issued since 1790, trademarks published since 1872, and select collections of foreign patents. All PTDLs have both the patent and trademark sections of the *Official Gazette of the U.S. Patent and Trademark Office.* The full-text utility and design patents are distributed numerically on 16 mm microfilm, and plant patents on color microfiche. Patent and trademark search systems on CD-ROM (Compact Disc-Read Only) format are available at all PTDLs to increase utilization of and enhance access to the information found in patents and trademarks. It is through the CD-ROM systems that preliminary patent and trademark searches can be conducted through the numerically arranged collections.

All information is available for use by the public free of charge.

In addition, each PTDL offers reference publications which outline and provide access to the patent and trademark classification systems, as well as other documents and publications which supplement the basic search tools. PTDLs provide technical staff assistance in using all materials. Facilities for making paper copies of patent and trademark information are generally provided for a fee.

Since there are variations in the scope of patent and trademark collections among the PTDLs, and their hours of service to the public vary, anyone contemplating use of these collections at a particular library is urged to contact that library in advance about its collections, services, and hours in order to avert possible inconvenience.

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| Arkansas | Little Rock: Arkansas State Library | (501) 682-2053 |
| California | Los Angeles Public Library | (213) 228-7220 |
| | Sacramento: California State Library | (916) 654-0069 |
| | San Diego Public Library | (619) 236-5813 |
| | San Francisco Public Library | (415) 557-4488 |
| | Sunnyvale Patent Clearinghouse | (408) 730-7290 |
| Colorado | Denver Public Library | (303) 640-6249 |
| Connecticut | New Haven: Science Park Library | (203) 786-5447 |
| Delaware | Newark: University of Delaware Library | (302) 831-2965 |
| Dist. of Columbia | Washington: Howard University Libraries | (202) 806-7252 |
| Florida | Fort Lauderdale: Broward County Main Library | (305) 357-7444 |
| | Miami-Dade Public Library | (305) 375-2665 |
| | Orlando: University of Central Florida Libraries | (407) 823-2562 |
| | Tampa Campus Library, University of South Florida | (813) 974-2726 |
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| Idaho | Moscow: University of Idaho Library | (208) 885-6235 |
| Illinois | Chicago Public Library | (312) 747-4450 |
| | Springfield: Illinois State Library | (217) 782-5659 |
| Indiana | Indianapolis-Marion County Public Library | (317) 269-1741 |
| | West Lafayette Siegesmund Engineering Library, Purdue University | (317) 494-2872 |
| Iowa | Des Moines: State Library of Iowa | (515) 281-4118 |
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| Maine | Orono: Raymond H. Fogler Library, University of Maine | (207) 581-1678 |
| Maryland | College Park: Engineering and Physical Sciences Library, University of Maryland | (301) 405-9157 |
| Massachusetts | Amherst: Physical Sciences Library, University of Massachusetts | (413) 545-1370 |
| | Boston Public Library | (617) 536-5400 Ext. 265 |
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| | Big Rapids: Abigail S. Timme Library, Ferris State University | (616) 592-3602 |
| | Detroit: Great Lakes Patent and Trademark Center | (313) 833-1450 |
| Minnesota | Minneapolis Public Library and Information Center | (612) 372-6570 |
| Mississippi | Jackson: Mississippi Library Commission | (601) 359-1036 |
| Missouri | Kansas City: Linda Hall Library | (816) 363-4600 |
| | St. Louis Public Library | (314) 241-2288 Ext. 390 |
| Montana | Butte: Montana College of Mineral Science and Technology Library | (406) 496-4281 |
| Nebraska | Lincoln: Engineering Library, University of Nebraska-Lincoln | (402) 472-3411 |
| Nevada | Reno: University of Nevada, Reno Library | (702) 784-6579 |
| New Hampshire | Durham: University of New Hampshire Library | (603) 862-1777 |
| New Jersey | Newark Public Library | (201) 733-7782 |
| | Piscataway: Library of Science and Medicine, Rutgers University | (908) 445-2895 |
| New Mexico | Albuquerque: University of New Mexico General Library | (505) 277-4412 |
| New York | Albany: New York State Library | (518) 474-5355 |
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| North Dakota | Grand Forks: Chester Fritz Library, University of North Dakota | (701) 777-4888 |
| Ohio | Akron: Summit County Public Library | Not Yet Operational |
| | Cincinnati and Hamilton County, Public Library of | (513) 369-6936 |
| | Cleveland Public Library | (216) 623-2870 |
| | Columbus: Ohio State University Libraries | (614) 292-6175 |
| | Toledo/Lucas County Public Library | (419) 259-5212 |
| Oklahoma | Stillwater: Oklahoma State University Center for International Trade Development | (405) 744-7086 |
| Oregon | Portland: Paul L. Boley Law Library, Lewis & Clark College | Not Yet Operational |
| Pennsylvania | Philadelphia, The Free Library of | (215) 686-5331 |
| | Pittsburgh, Carnegie Library of | (412) 622-3138 |
| | University Park: Pattee Library, Pennsylvania State University | (814) 865-4861 |
| Puerto Rico | Mayaquez General Library, University of Puerto Rico | Not Yet Operational |
| Rhode Island | Providence Public Library | (401) 455-8027 |
| South Carolina | Clemson University Libraries | (803) 656-3024 |
| South Dakota | Rapid City: Devereaux Library, South Dakota School of Mines and Technology | (605) 394-6822 |
| Tennessee | Memphis & Shelby County Public Library and Information Center | (901) 725-8877 |
| | Nashville: Stevenson Science Library, Vanderbilt University | (615) 322-2775 |
| Texas | Austin: McKinney Engineering Library, University of Texas at Austin | (512) 495-4500 |
| | College Station: Sterling C. Evans Library, Texas A & M University | (409) 845-3826 |
| | Dallas Public Library | (214) 670-1468 |
| | Houston: The Fondren Library, Rice University | (713) 527-8101 Ext. 2587 |
| Utah | Salt Lake City: Marriott Library, University of Utah | (801) 581-8394 |
| Virginia | Richmond: James Branch Cabell Library, Virginia Commonwealth University | (804) 828-1104 |
| Washington | Seattle: Engineering Library, University of Washington | (206) 543-0740 |
| West Virginia | Morgantown: Evansdale Library, West Virginia University | (304) 293-2510 |
| Wisconsin | Madison: Kurt F. Wendt Library, University of Wisconsin Madison | (608) 262-6845 |
| | Milwaukee Public Library | (414) 286-3051 |
| Wyoming | Casper: Natrona County Public Library | (307) 237-4935 |

# PATENT EXAMINING CORPS

BRUCE A. LEHMAN, Commissioner
LAWRENCE J. GOFFNEY Jr., Assistant Commissioner for Patents
EDWARD R. KAZENSKE, Deputy Assistant Commissioner for Patents
STEPHEN G. KUNIN, Deputy Assistant Commissioner for Patent Policy
J.O. THOMAS, JR., Deputy Assistant Commissioner for Patent Process Services

| PATENT EXAMINING GROUPS | Phone number Area Code 703 | New Case Date* |
|---|---|---|
| **CHEMICAL EXAMINING GROUPS** | | |
| GENERAL METALLURGICAL, INORGANIC, PETROLEUM AND ELECTRICAL CHEMISTRY, ENGINEERING AND DESIGNS, GROUP 1100—JOHN E. KITTLE, Director | 308-0661 | 07/14/94 |
| ORGANIC CHEMISTRY, DRUG, BIO-AFFECTING AND BODY TREATING COMPOSITION, GROUP 1200—RICHARD V. FISHER, Director | 308-1235 | 07/01/94 |
| SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP 1300—BARRY S. RICHMAN, Director | 308-0651 | 08/29/94 |
| HIGH POLYMER CHEMISTRY, PLASTICS, COATING, PHOTOGRAPHY STOCK MATERIALS AND COMPOSITIONS, GROUP 1500—THEODORE MORRIS, Director | 308-2351 | 10/06/94 |
| BIOTECHNOLOGY, GROUP 1800—JOHN J. DOLL, Director | 308-0196 | 04/22/94 |
| **ELECTRICAL EXAMINING GROUPS** | | |
| INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 2100—STEWART LEVY, Director | 308-1782 | 02/28/94 |
| SPECIAL LAWS AND ADMINISTRATION, GROUP 2200—ROBERT E. GARRETT, Director | 308-0511 | 07/12/94 |
| COMPUTER SYSTEMS AND COMPUTER APPLICATION, GROUP 2300—BOBBY R. GRAY, Director | 305-9600 | 07/15/93 |
| SPECIAL COMPUTER APPLICATIONS: COMPUTER GRAPHICS, BUSINESS PRACTICES, & DIAGNOSTIC TESTING, GROUP 2400—GERALD GOLDBERG, Director | 305-3800 | 04/04/94 |
| ELECTRONIC AND OPTICAL SYSTEMS AND DEVICES, GROUP 2500—JANICE A. HOWELL, Director | 308-0956 | 07/05/94 |
| COMMUNICATIONS, MEASURING, TESTING AND LAMP/DISCHARGE GROUP, GROUP 2600—NICHOLAS P. GODICI, Director | 305-4700 | 05/31/94 |
| DESIGN, GROUP 2900—JOHN E. KITTLE, Director | 308-0661 | 07/11/94 |
| **MECHANICAL EXAMINING GROUPS** | | |
| HANDLING AND TRANSPORTATION MEDIA, GROUP 3100—F.R. SCHMIDT, Director | 308-1113 | 05/16/94 |
| MATERIAL SHAPING, ARTICLE MANUFACTURING AND TOOLS, GROUP 3200—CARLTON R. CROYLE, Director | 308-1148 | 08/23/94 |
| MEDICAL INSTRUMENTS, DIAGNOSTIC EQUIPMENT AND TREATMENT DEVICES; SURGERY AND SURGICAL SUPPLIES; AMUSEMENT AND EXERCISING DEVICES; ANIMAL HUSBANDRY; SPORTING GOODS; TOBACCO PRODUCTS AND MANUFACTURING EQUIPMENT; AND PRINTING, GROUP 3300—J.J. LOVE, Director | 308-0858 | 11/07/94 |
| SOLAR, HEAT, POWER, AND FLUID ENGINEERING DEVICES, GROUP 3400—DONALD G. KELLY, Director | 308-0861 | 10/06/94 |
| GENERAL CONSTRUCTION, PETROLEUM AND MINING ENGINEERING, GROUP 3500—A.L. SMITH, Director | 308-1021 | 07/12/94 |

*A communication from the examiner should have been received in most applications filed prior to this date.

**Patents will Expire as Follows:**
(1) The term of any utility or plant patent that is in force on or results from an application filed before June 8, 1995 is the greater of the 20 year term provided in 35 U.S.C. 154(a)(2) or 17 years from grant subject to any terminal disclaimers. 35 U.S.C. 154(c)(1).
(2) All utility and plant patents granted on applications having an actual United States filing date on or after June 8, 1995 are granted for a term which begins on the date on which the patent is granted and ends 20 years from the date on which the application was filed in the United States. If the application contains a specific reference to an earlier application under 35 U.S.C. 120, 121 or 365(c), the patent term ends twenty years from that date on which the earliest application was filed. 35 U.S.C. 154(a)(2).
(3) All design patents are granted for a term of 14 years from the date of the grant.
However, the term of any patent may have been curtailed by disclaimer under the provisions of 35 U.S.C. 153, have lapsed due to failure to pay maintenance fees, or have been extended under the provisions of 35 U.S.C. 154, 155, or 156. Thus, if more reliable information is needed with respect to a particular patent, then the specific patent file should be reviewed to determine the actual date of patent expiration.

# TRADEMARK OPERATION

**Bruce A. Lehman, Commissioner**
**Philip G. Hampton, II, Assistant Commissioner**
**Robert M. Anderson, Deputy Assistant Commissioner**
**David E. Bucher, Director, Trademark Examining Office**
**Condition of Trademark Applications as of January 1, 1996**

| Law Office | Oldest Date New* | Oldest Date Amendment Filed |
|---|---|---|
| Law Office 101—Ron Sussman, Acting Managing Attorney, (703) 308–9101—4th Floor<br>Foods, Beverages, Wines & Spirits—Int. Classes 29, 30, 31, 32, 33<br>Services—Int. Classes 35, 36, 37, 38, 39, 40, 41, 42 | 05/30/95 | 10/30/95 |
| Law Office 102—Myra Kurzbard, Managing Attorney, (703) 308–9102—5th Floor<br>Scientific Equipment & Furniture—Int. Classes 9, 20<br>Services—Int. Classes 35, 36, 37, 38, 39, 40, 41, 42 | 07/05/95 | 09/20/95 |
| Law Office 103—Kathryn Erskine, Managing Attorney, (703) 308–9103—5th Floor<br>Scientific Equipment & Furniture—Int. Classes 9, 20<br>Services—Int. Classes 35, 36, 37, 38, 39, 40, 41, 42 | 06/19/95 | 12/06/95 |
| Law Office 104—Sidney Moskowitz, Managing Attorney, (703) 308–9104—6th Floor<br>Unwrought metals, Industrial Equipment, Tools, Installation, Vehicles, Firearms, Musical Instruments, Building Materials & Floor Coverings—Int. Classes 6, 7, 8, 11, 12, 13, 15, 19, 27 Services—Int. Classes 35, 36, 37, 38, 39, 40, 41, 42 | 06/27/95 | 10/10/95 |
| Law Office 105—Thomas Howell, Managing Attorney, (703) 308–9105—6th Floor<br>Chemicals, Paints, Lubricants, Pharmaceuticals, Medical Apparatus & Tobacco—Int. Classes 1, 2, 4, 5, 10, 34 Services—Int. Classes 35, 36, 37, 38, 39, 40, 41, 42 | 07/17/95 | 07/17/95 |
| Law Office 106—Mary Sparrow, Managing Attorney, (703) 308–9106—7th Floor<br>Cosmetics, Cleaning Preparations, Paper Products & Toys—Int. Classes 3, 16, 28 Services—Int. Classes 35, 36, 37, 38, 39, 40, 41, 42 | 07/25/95 | 08/11/95 |
| Law Office 107—Thomas Lamone, Managing Attorney, (703) 308–9107—7th Floor<br>Cosmetics, Cleaning Preparations, Paper Products & Toys—Int. Classes 3, 16, 28 Services—Int. Classes 35, 36, 37, 38, 39, 40, 41, 42 | 07/28/95 | 11/03/95 |
| Law Office 108—David Shallant, Managing Attorney, (703) 308–9108—8th Floor<br>Precious metals, Fibers, Leather goods, Housewares, Cordage, Yarns, Fabrics, Clothing & Notions—Int. Classes 14, 17, 18, 21, 22, 23, 24, 25, 26<br>Services–Int. Classes 35, 36, 37, 38, 39, 40, 41, 42 | 07/31/95 | 10/05/95 |
| Law Office 109—Deborah Cohn, Managing Attorney, (703) 308–9109—8th Floor<br>Precious metals, Fibers, Leather goods, Housewares, Cordage, Yarns, Fabrics, Clothing & Notions—Int. Classes 14, 17, 18, 21, 22, 23, 24, 25, 26<br>Services—Int. Classes 35, 36, 37, 38, 39, 40, 41, 42 | 08/10/95 | 10/10/95 |
| **Collective Marks—Class 200<br>**Certification Marks—Classes A & B | | |
| Office of Trademark Services—John Walker, Director, (703) 308-9100<br>Trademark Assistance Center—(703) 308-9000<br>Pre-Examination—Alan Lambert, Supervisor, (703) 308-9401 ext. 188<br>Intent-To-Use—(ITU)—(703) 308-9500<br>Post Registration Section—Mary Bowman, Supervisor, (703) 308-9500 ext. 126 | | |
| Affidavits Under Sections 8 & 15 (All Classes) | 05/11/95 | —0— |
| Renewals (All Classes) | 10/10/95 | —0— |
| Section 12(c) Publications (All Classes) | 07/12/95 | —0— |

1. ** Assigned to all Law Office

2. Applicants with inquiries concerning the status of their applications and a touch telephone should call (703) 305–8747 through (703) 305-9752 from 6:30 a.m. to Midnight EST, Monday through Friday. This automated voice system will provide the current status of your application. Applicants are urged not to file unnecessary inquiries concerning the status of their applications. See SECTION 411 of the TRADEMARK MANUAL OF EXAMINING PROCEDURE.

3. * These dates identify the oldest unassigned new case in each Law Office. All cases with earlier dates have either been examined and made the subject of an action or are currently being worked on by the assigned examining attorney.

# REEXAMINATIONS

## FEBRUARY 13, 1996

Matter enclosed in heavy brackets [ ] appears in the patent but forms no part of this reexamination specification; matter printed in italics indicates additions made by reexamination.

**B1 4,286,007 (2795th)**

**REPAIR PATCH FOR CONTAINER AND LORRY SHEETS**

**Willi Oellerking, Schleswig, Germany, assignor to Schleswiger Tauwerkfabric Oellerking GmbH & Co. KG, Schleswig, Germany**

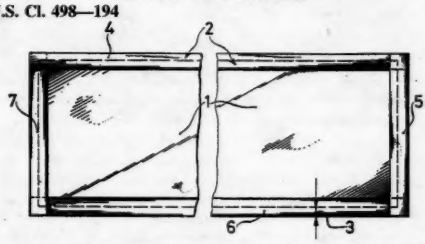
**Reexamination Request No. 90/003,600, Oct. 13, 1994.**

**Reexamination Certificate for Patent 4,286,007, issued Aug. 25, 1981, Ser. No. 13,251, Feb. 21, 1979.**

**Claims priority, application Germany, Feb. 22, 1978, 2807439**

**Int. Cl.**[6] **B32B** *3/06;35/00*

**U.S. Cl. 498—194**




AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claims **1–4** is confirmed.

**1**. A repair patch for use in repairing damaged areas in protective cover sheets for loading openings of containers, lorries, or the like utilized in international goods transportation wherein, to satisfy customs regulations, a sealing strip must be attached around the periphery of the patch and overlapping the patch and the cover sheet and embossed with a relief pattern so that once the patch has been applied to the cover sheet, any tampering with the patch will be readily discoverable, said repair patch comprising:

a piece of fabric having outer and inner surfaces and peripheral edges defining an area of predetermined size and shape for covering the damaged area in the cover sheet;

a coating of a weldable plastic material on at least the inner surface of said piece of fabric for welding the fabric to the cover sheet over the damaged area; and

an elongate sealing strip of an embossable, weldable thermoplastic material connected to the outer surface of said piece of fabric and extending around the periphery thereof, with portions of the sealing strip projecting outwardly beyond said peripheral edges of the fabric to form a circumferential outwardly projecting margin for welding to the cover sheet when the piece of fabric is positioned over the damaged area of the cover sheet and said weldable coating is secured to the cover sheet.

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**B1 5,195,299 (2796th)**

**METHOD OF REDUCING MOISTURE CONTENT OF HERMETIC PACKAGES CONTAINING SEMICONDUCTOR DEVICES**

**My N. Nguyen, San Diego, Calif., assignor to Johnson Matthey Inc., Valley Forge, Pa.**

**Reexamination Request No. 90/003,179, Aug. 31, 1993.**

**Reexamination Certificate for Patent 5,195,299, issued Mar. 23, 1993, Ser. No. 843,735, Feb. 28, 1992.**

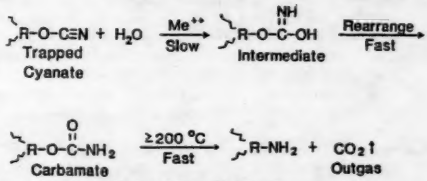
**The portion of the term of this patent subsequent to Sep. 22, 2009, has been disclaimed.**

**Int. Cl.**[6] **B65B** *25/00;31/02*

**U.S. Cl. 53—428**

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claims **1–3** is confirmed.




New claim **4** is added and determined to be patentable.

**1**. A method of reducing the water moisture content in a hermetic package containing a semiconductor device comprising incorporating within said package a small but effective amount of cyanate ester, reacting said cyanate ester with water to produce an imidocarbonic acid which molecularly rearranges upon formation into a stable carbamate molecular structure, exposing said package to an elevated temperature in the range of about 100° C. to 400° C. whereby said carbamate further reacts with water to produce carbon dioxide.

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**B1 5,272,396 (2797th)**

**CONTROLLABLE BUS TERMINATOR WITH VOLTAGE REGULATION**

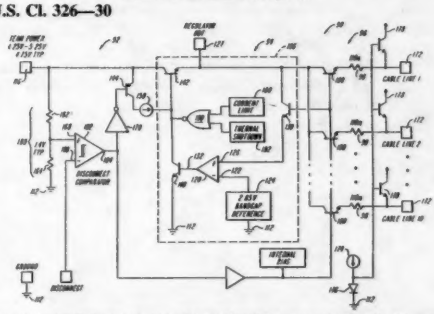
**Robert A. Mammano, Costa Mesa, Calif., and Mark Jordan, Manchester, N.H., assignors to Unitrode Corporation, Billerica, Mass.**

**Reexamination Request No. 90/003,671, Dec. 23, 1994.**

**Reexamination Certificate for Patent 5,272,396, issued Dec. 21, 1993, Ser. No. 755,072, Sep. 5, 1991.**

**Int. Cl.**[6] **H03K** *17/16;3/01*

**U.S. Cl. 326—30**



AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claims **3–11** is confirmed.

Claims **2** and **12–14** are cancelled.

Claim **1** is determined to be patentable as amended.

**1**. A controllable bus terminator, for providing a switchable termination on a bus having a plurality of conductors, said controllable bus terminator comprising:

a voltage regulator;

a plurality of resistive networks each of said resistive networks having a first terminal and a second terminal wherein the second terminal of each of said resistive networks provides an output terminal of said bus terminator;

a plurality of electrically controllable switches *each of which has a first port, a second port, and a control port*, each of said switches having **[**a**]** *said* first port *thereof* coupled to said voltage regulator and **[**a**]** *said* second port *thereof* coupled to the first terminal of a corresponding one of said resistive networks wherein each of said switches couple the corresponding resistive network to said voltage regulator when the

corresponding switch is in a first state and wherein each of said switches disconnect the corresponding resistive network from said voltage regulator when the corresponding switch is in a second state;

a control circuit having an output terminal coupled to *the control port of* each of said plurality of electrically controllable switches, said control circuit for providing a first control signal *to said control ports* which causes each of said electrically controllable switches to switch from said first state to said second state and for providing a second control signal *to said control ports* which causes each of said electrically controllable switches to switch from said second state to said first state; and

wherein the output terminal of said control circuit is coupled to said voltage regulator and wherein a first one of said first and second control signals turns on said voltage regulator and a second one of said first and second control signals turns off said voltage regulator.

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**B1 5,338,979 (2798th)**

**CONTROLLABLE BUS TERMINATOR**

**Robert A. Mammano, Costa Mesa, Calif., and Mark Jordan, Manchester, N.H., assignors to Unitrode Corporation, Billerica, Mass.**

**Reexamination Request No. 90/003,672, Dec. 23, 1994.**

**Reexamination Certificate for Patent 5,338,979, issued Aug. 16, 1994, Ser. No. 88,911, Jul. 7, 1993.**

**Continuation of Ser. No. 990,133, Dec. 14, 1992, abandoned, which is a continuation of Ser. No. 755,072, Sep. 5, 1991, Pat. No. 5,272,396.**

**Int. Cl.**[6] **H03K** *17/16;3/01*

**U.S. Cl. 326—30**

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claims **18–20** is confirmed.

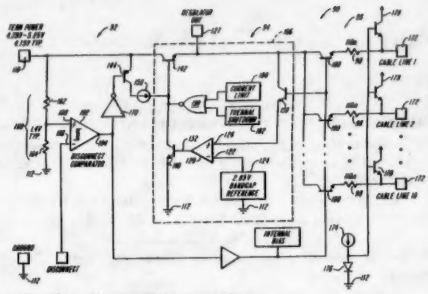
Claims **3–6** and **11–17** are cancelled.

Claims **1**, **7** and **8** are determined to be patentable as amended.

Claims **2** and **9–10**, dependent on an amended claim, are determined to be patentable.

**1**. A controllable bus terminator, for providing a switchable termination on a bus having a plurality of conductors, said controllable bus terminator comprising:

a voltage regulator;



a plurality of termination networks;

a plurality of electrically controllable switches *each of which has an input terminal, and output terminal, and a control terminal*,

each of said switches, said voltage regulator, and a coresponding one of said termination networks being coupled in series *with the input terminal of each said switch being connected to said voltage regulator and the output terminal of each said switch being coupled to the corresponding one of said termination networks*, wherein each of said switches couples the voltage regulator to a corresponding conductor through said termination network when the corresponding switch is in a first state and wherein each of said switches disconnects the voltage regulator from said corresponding conductor when the corresponding switch is in a second state;

a control circuit comprising an output terminal coupled to *the control terminal of* each of said plurality of electrically controllable switches, said control circuit for providing a first control signal *to said control terminals* which causes each of said electrically controllable switches to switch from said first state to said second state and for providing a second control signal *to said control terminals* which causes each of said electrically controllable switches to switch from said second state to said first state; and

wherein the output terminal of said control circuit is coupled to said voltage regulator and wherein a first one of said first and second control signals turns on said voltage regulator and a second one of said first and second control signals turns off said voltage regulator.

# REISSUES

## FEBRUARY 13, 1996

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

**Re. 35,154**

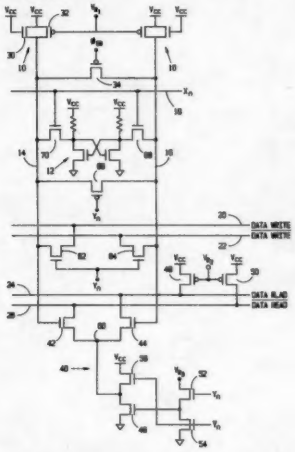
### BIT LINE AND COLUMN CIRCUITRY USED IN A SEMICONDUCTOR MEMORY

**Kim C. Hardee, Colorado Springs, Colo., assignor to Thorn EMI North America, Inc., Wilmington, Del.**

**Original No. 4,791,613, dated Dec. 13, 1988, Ser. No. 633,091, Jul. 25, 1984. Continuation-in-part of Ser. No. 534,484, Sep. 21, 1983, abandoned. Application for reissue Jul. 19, 1989, Ser. No. 382,178**

**Int. Cl.[6] G11C** *7/00;11/419*

**U.S. Cl. 365—189.09** **16 Claims**



**1**. In a CMOS integrated circuit device, a memory array and control circuitry therefor comprising:

a plurality of pairs of column lines;

a plurality of word lines;

a plurality of multi-transistor memory cells, each cell including a pair of cross-coupled N-channel transistors and being located at an intersection of, and connected to, a pair of column lines and one said word line;

a plurality of bias [means] *circuite* each connected to a corresponding column line, each [said] bias *circuit* ]means] including a P-channel transistor and an N-channel transistor each having its source-drain path coupled between a supply voltage and [said] *a* corresponding column line, each [said] bias [means serving to limit the current drain to the threshold level of said P-channel transistor] *circuit being arranged to limit the voltage swing on the corresponding column line* as the *corresponding* column line for the particular bias [means] *circuit* is pulled toward ground; and

a voltage reference circuit [connected] *coupled* to said supply voltage [input] and having an output connected to the gates of said P-channel transistors for each pair of [said] bias [means] *circuits* connected to a pair of column lines, said reference circuit providing compensation means for reducing the effects of [process variations between elements of said] *changes in the ambient conditions within the integrated circuit* device.

**7**. In a semi-conductor memory having at least two columns of memory cells for storing data, each column having a pair of bit lines coupled to plurality of memory cells, said memory having a pair of data read lines and having address means for providing a column select signal to each column, column circuitry comprising:

a respective differential amplifier for each of said columns, each said differential amplifier being coupled between said read lines and the pair of bit lines in the corresponding column, each differential amplifier being responsive to an associated column select signal to provide output signals on the read lines representative of the data stored in one of the memory cells in the corresponding columns when the column is selected; and

Sneak capacitance reduction means coupled between the pair of bit lines in each of columns and responsive to a column select signal for coupling together the pair of bit lines in a corresponding column when the corresponding column is not selected.

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**Re. 35,155**

### CASSETTE HOLDING DEVICE FOR A TAPE RECORDER

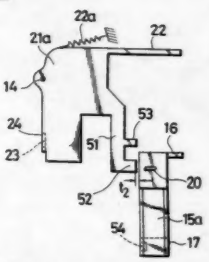
**Shinsaku Tanaka, Tokyo; Tadao Arata, Inagi, and Takayuki Kitazawa, Yokohama, all of, Japan, assignors to Tanashin Denki Co., Ltd., Tokyo, Japan**

**Original No. 4,802,037, dated Jan. 31, 1989, Ser. No. 55,885, Jun. 1, 1987. Application for reissue Jan. 25, 1995, Ser. No. 378,378**

**Claims priority, application Japan, Sep. 11, 1986, 61-138586**

**Int. Cl.[6] G11B** *15/00*

**U.S. Cl. 360—96.5** **2 Claims**



**1**. A cassette holding device for a tape recorder, comprising a cassette holder for removably receiving a tape cassette therein, said cassette holder being coupled to a base plate for movement between an operative position in which recording on or reproduction from a tape within a tape cassette received therein can be achieved and a rest position, *first* spring means for urging said cassette holder toward the operative position, an arresting member mounted on said cassette holder for selective back and forth movement between an advanced position and a retracted position, stationary arresting means located on said base plate for engagement with said arresting member at the advanced position to arrest said cassette holder to the rest position, an ejecting member coupled to an end of [said] *second* spring means and mounted for back and forth movement between an advanced position and a retracted position on said cassette holder, said ejecting member being retracted by an inserting force of a tape cassette inserted into said cassette holder to disengage said arresting member from said stationary arresting means while accumulating a spring force in said *second* spring means, said ejecting member being advanced, when allowed, by the accumulated spring force to push back the tape cassette in a direction to unload the tape cassette, and means on said ejecting member for limiting, when said ejecting member is at the advanced position, movement of said arresting member away from the advanced position to maintain the engagement of said arresting member with said stationary arresting means.

# PLANT PATENTS

## GRANTED FEBRUARY 13, 1996

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

**9,451**

**Patent Not Issued For This Number**

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**9,452**

**POINSETTIA PLANT NAMED 'RED DELIGHT'**

**Lyndon W. Drewlow, Ashtabula, Ohio, assignor to Mikkelsens Inc., Ashtabula, Ohio**

**Filed Feb. 6, 1995, Ser. No. 383,841**

**Int. Cl.**[6] **A01H** *5/00*

**U.S. Cl. Plt.—86.4** **1 Claim**

1. A new and distinct poinsettia plant named Red Delight, as illustrated and described.

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**9,453**

**Patent Not Issued For This Number**

# PATENTS

## GRANTED FEB. 13, 1996

### ERRATA

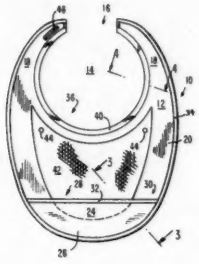
| For CLASS | See PATENT NO. |
|---|---|
| 029–027 | 5,490,307 |
| 029–403 | 5,490,631 |
| 299–037 | 5,490,740 |
| 600–201 | 5,490,819 |
| 601–041 | 5,490,820 |
| 601–134 | 5,490,821 |
| 602–016 | 5,490,822 |
| 044–331 | 5,490,863 |
| 044–379 | 5,490,864 |
| 044–328 | 5,490,872 |
| 051–295 | 5,490,878 |
| 095–045 | 5,490,884 |
| 106–709 | 5,490,889 |
| 134–030 | 5,490,894 |
| 148–241 | 5,490,908 |
| 558–431 | 5,491,264 |
| 331–003 | 5,491,451 |
| 327–552 | 5,491,452 |
| 327–553 | 5,491,453 |
| 395–110 | 5,491,493 |
| 375–354 | 5,491,531 |
| 360–113 | 5,491,605 |
| 360–113 | 5,491,606 |
| 360–137 | 5,491,607 |
| 375–333 | 5,491,713 |
| 395–139 | 5,491,769 |

# PATENTS

## GRANTED FEBRUARY 13, 1996

## GENERAL AND MECHANICAL

**5,490,289**
**BABY BIB**
**Peggy Lehrer, 92 Round Hill Rd., Armonk, N.Y. 10504**
**Filed May 25, 1994, Ser. No. 248,760**
**Int. Cl.[6] A41B** *13/10*
**U.S. Cl. 2—49.2** **5 Claims**



**1.** A bib, comprising a first panel adapted to overlie the chest region of a wearer, said first panel being of an elongated construction, having a first, outwardly-lying, water-resistant layer and a second, inwardly-lying fabric layer, and having a pair of opposed leg segments extending upwardly at an upper margin thereof; cooperating attachment means mounted to a distal end of each of said legs to join said legs at any of a plurality of positions to adjustably size the legs about a neck of the wearer; a second panel of an absorbent material removably mounted upon an outward-lying surface of said first panel in a central position thereon; a pocket located on said outwardly-lying surface of said first panel and extending upwardly from a lower edge thereof, said pocket comprising a first, outwardly-lying, water-resistant material layer and a second, inwardly-lying fabric layer, said second panel extending downwardly below the top margin of said pocket; and a neck liner affixed about a portion of said first panel in an area including at least a portion of said legs for embracing the neck of the wearer, said liner comprising means for providing a snug and flexible line of contact between the bib and neck.

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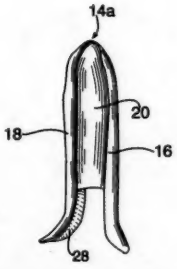
**5,490,290**
**OPEN FINGERED GLOVE STRUCTURE**
**Danny Gold, 27 Barker Road, Apt. E-2, Hong Kong, Hong Kong**
**Filed Feb. 15, 1995, Ser. No. 388,692**
**Int. Cl.[6] A41D** *19/00*
**U.S. Cl. 2—159** **7 Claims**




**1.** An improved open fingered glove comprising:
glove back means, formed generally in the shape of a human hand for forming at least a portion of the back of the glove;
glove palm means, formed generally in the shape of a human hand, for forming at least a portion of the palm of the glove; and
thumb means, generally formed to cover a wearer's thumb;
said glove back means and said glove palm means to define a plurality of fingers, each of said fingers comprising an inner side defined as that side of the finger closest to said thumb piece an outer side defined as that side of the finger furthest away from said thumb piece, a tip defined as that area closest to the end of the finger and a crotch area defined as that area furthest away from the tip of the finger; and
said improved open fingered glove further comprising connector means for connecting the fingers of said back piece to the fingers of said palm piece along at least one side of each finger and an outside of said crotch area leaving said crotch area open, said connector strips being located proximate to the tip of the finger to which it is attached and extending to a point outside the crotch area.

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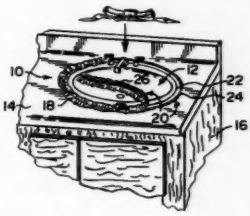
**5,490,291**
**LACE WORKS FOR BATHROOM SINKS AND SIMILAR ARTICLES**
**Christine J. Direnzo, 17 Tarboro St., Elmont, N.Y. 11003-1706**
**Filed Aug. 29, 1994, Ser. No. 297,407**
**Int. Cl.[6] E03C** *1/33*
**U.S. Cl. 4—661** **2 Claims**




**1.** A method of attaching a lace works for a bathroom sink on a counter top of a vanity including the steps of:
a) securing a strip of a first strip of hook and loop pile fastener material by adhesive means to said sink on said counter top; and
b) removably attaching said lace works to said first strip with a second strip of hook and loop pile fastener material which is permanently attached to said lace works.

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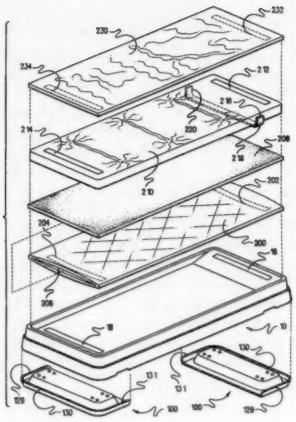
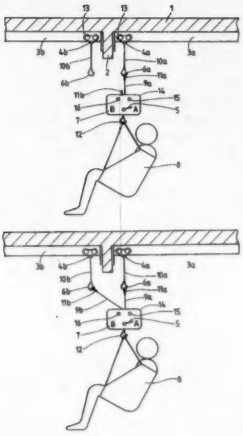
**5,490,292**
**COT**
**David M. Auburn, 9762 W. Ken Caryl Dr., Littleton, Colo. 80127**
**Filed Mar. 10, 1993, Ser. No. 29,139**
**Int. Cl.[6] A47C** *19/00;21/00*
**U.S. Cl. 5—8** **20 Claims**

**1.** A cot, comprising:
an elongated substantially hollow body possessing a closed curve construction, said hollow body rotationally molded from a plastic material;
said body including a substantially planar sleeping surface intersecting an inclined head rest portion;
a substantially enclosed insulating air space formed within said body beneath said sleeping surface;
a second insulating air space disposed beneath said enclosed insulating air space and adapted to separate said enclosed insulating air space from a floor supporting said cot;



169-040 O.G.-96-2: QL3





a raised bottom wall at least partially defining said enclosed insulating air space;

at least one pillar extending upwardly from said raised bottom wall for supporting said sleeping surface;

said body including a top portion and a recessed bottom portion dimensioned to receive said top portion such that a plurality of identical cots may be stored in nested stacked relation;

said top and bottom portions at least partially defined by a separating peripherally extending shoulder;

at least one dolly including at least one rotatable element dimensioned for engagement with said cot to facilitate transportation and storage;

said at least one dolly dimensioned for at least partial nesting within said recessed bottom portion;

said at least one dolly including channel portions dimensioned for at least partial insertion of bottom edges of said cot and said dolly further including side walls dimensioned to at least partially overlie side wall portions of said cot;

a pad;

a cover for said pad;

cooperating fasteners on said cover and said cot for releasably securing said cover and pad to said cot;

a mattress;

cooperating fasteners on said mattress and said cot for releasably securing said mattress to said cot;

a laterally extending elastic strap on said mattress for securing said mattress in a rolled condition for transportation and storage;

a sheet; and

means for securing said sheet to said mattress.

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**5,490,293**

**TRANSFER APPARATUS**

**Per Nilsson, Östra Rönneholmsvägen 26, S-211 47 Malmö, Sweden**

**PCT No. PCT/SE93/00080, § 371 Date Jul. 22, 1994, § 102(e) Date Jul. 22, 1994, PCT Pub. No. WO93/15705, PCT Pub. Date Aug. 19, 1993**

**PCT Filed Feb. 2, 1993, Ser. No. 256,965**

**Claims priority, application Sweden, Feb. 10, 1992, 9200378**

**Int. Cl.[6] A61G** *7/10*

**U.S. Cl. 5—83.1** **12 Claims**

7. Load transport apparatus for a carrier member with a load, said apparatus comprising:

first and second separate transport paths,

first and second displaceable devices respectively supported for displacement along said first and second transport paths,

first and second connecting means for respectively suspending a carrier member from the first and second displaceable devices, each connecting means including a connecting device for connecting the carrier member to the respective displaceable device, and a releasable coupling for selectively connecting the respective connecting device to the respective displaceable device,

at least one of said connecting devices having an adjustable length between its connection to the carrier member and to its respective displaceable device,

said first and second transport paths being separated at a location at which transfer of the carrier member is to be made from the first transport path to the second transport path, said at least one of the connecting devices being changed in length to transfer the support of the carrier member from the first transport path to the second transport path after which the first connecting device can be disconnected from the first displaceable device by the respective releasable coupling.

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**5,490,294**

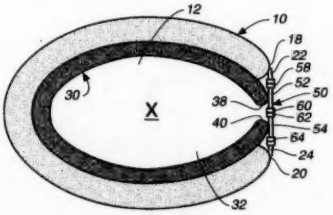
**SLEEPING BAG WITH REMOVABLE BAG LINER**

**Paul F. Kramer, Berkeley, Calif., assignor to Mountian Hardwear, Inc., Berkeley, Calif.**

**Filed Dec. 5, 1994, Ser. No. 349,395**

**Int. Cl.[6] A47G** *9/08*; **A47C** *29/00*

**U.S. Cl. 5—413** **14 Claims**




1. In combination:

a sleeping bag defining a bag interior, a bag head opening, and a bag longitudinal opening extending longitudinally along the sleeping bag and communicating with said bag head opening and said bag interior, said bag longitudinal opening being defined by first and second spaced elongated bag edges, said sleeping bag including a first row of bag zipper teeth disposed

along said first spaced elongated bag edge and a second row of bag zipper teeth disposed along said second spaced elongated bag edge;

a removable bag liner positioned in said bag interior defining a liner interior having a liner head opening and a liner longitudinal opening extending longitudinally, along the bag liner and communicating with said liner head opening and said liner interior, said liner longitudinal opening being defined by first and second spaced elongated liner edges; and

a zipper assembly attached to said bag liner, said zipper assembly including first and second pairs of spaced rows of liner zipper teeth, the first pair of spaced rows of liner zipper teeth secured to said first spaced elongated liner edge and parallel thereto and the second pair of spaced rows of liner zipper teeth secured to said second spaced elongated liner edge and parallel thereto, a first zipper slide slidably disposed on and releasably interconnecting said first row of bag zipper teeth and a row of liner teeth of the first pair of spaced rows of liner teeth, a second zipper slide slidably disposed on and releasably interconnecting said second row of bag zipper teeth and a row of liner teeth of the second pair of spaced rows of liner teeth, and a third zipper slide slidably disposed on and releasably interconnecting adjacent rows of liner teeth of said first and second pairs of spaced rows of liner teeth between the rows of liner teeth releasably interconnected to said rows of bag zipper teeth, said zipper assembly releasably securing said bag liner to said sleeping bag.

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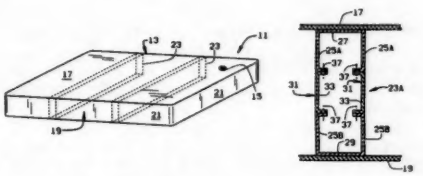
**5,490,295**

## WATER MATTRESS AND AIR MATTRESS CONSTRUCTION

**Dennis Boyd, 14457 Rouge River, Chesterfield, Mo. 63017**

**Filed Apr. 15, 1994, Ser. No. 228,295**
**Int. Cl.[6] A47C** *27/08*
**U.S. Cl. 5—451** **12 Claims**



1. A water mattress comprising;

a closeable vinyl envelope defining a cavity for receiving water, said vinyl envelope having a top, a bottom, and a plurality of sides, the sides being disposed in opposing pairs;

at least one double-walled member extending from the top to the bottom of the envelope inside the cavity, said double-walled member having a top connecting web extending across the top thereof and two walls depending from said connecting web, said connecting web being secured to the top of the envelope, said double-walled member also being secured to the bottom of the envelope and extending longitudinally substantially from one side of the envelope to the opposing side of the envelope; said double-walled member also including a bottom connecting web and two walls extending upwardly from the bottom connecting web, the bottom connecting web being secured to the bottom of the envelope;

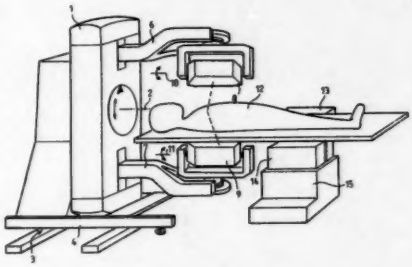
wherein the two walls depending from the top connecting web are connected to the two walls extending upwardly from the bottom connecting web by a separate intermediate member.

**5,490,296**

## HEIGHT-ADJUSTABLE BED

**Christophe Fleury, Guyancourt, and Christian Pare, Plaisir, both of, France, assignors to Sopha Medical, Paris, France**

**PCT No. PCT/FR92/01199, § 371 Date Oct. 5, 1994, § 102(e) Date Oct. 5, 1994, PCT Pub. No. WO93/11705, PCT Pub. Date Jun. 24, 1993**
**PCT Filed Dec. 17, 1992, Ser. No. 244,941**
**Claims priority, application France, Dec. 17, 1991, 91 15658**
**Int. Cl.[6] A47B** *13/00*
**U.S. Cl. 5—601** **20 Claims**



1. Examination bed, adjustable in height, and in an overhanging position, used in a mobile way for medical purposes, notably for tomography by scintigraphy, comprising a pedestal (**15**), a motor (**16**) and a patient support (**13**),

characterized in that it enables a large-amplitude shifting of the patient support (**13**) along the vertical, said bed comprising:

an intermediate carriage (**14**)

means (**18**), actuated by the motor (**16**), to push the intermediate carriage (**14**) vertically by making it slide with respect to the pedestal (**15**)

a patient support (**13**) shifting vertically along the intermediate carriage (**14**)

a pulley (**19**) fixed to the intermediate carriage (**14**) supporting a chain (**20**) whose ends (**26**) (**27**) are fixed to the pedestal (**15**) and to the patient support (**13**) in order to be capable of raising the patient support (**13**) when the means (**18**) to push the intermediate carriage (**14**) raise this carriage (**14**) and, consequently, the pulley (**19**)

the pedestal (**15**) and the patient support (**13**) comprising skids (**21**) that slide along four vertical rails (**22**) fixed to the intermediate carriage (**14**), two on the pedestal (**15**) side and two on the patient support (**13**) side, in order to enable, firstly, the vertical shifting of the intermediate carriage (**14**) with respect to the pedestal (**15**) and, secondly, that of the patient support (**13**) with respect to the intermediate carriage (**14**)

the rails (**22**) having a hexagon-sectioned shape so that the skids (**21**) cooperate respectively with at least four of the sides of the hexagonal section as to be capable of bearing the patient support (**13**) and the intermediate carriage (**14**) in directions perpendicular to the sides of the hexagon so as to prevent the tilting of the patient support (**13**).

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**5,490,297**

## MOBILE IMAGING TABLE

**James M. Bradcovich, Akron, and Richard J. Frankovich, North Olmsted, both of Ohio, assignors to Beta Medical Products, Inc., Akron, Ohio**

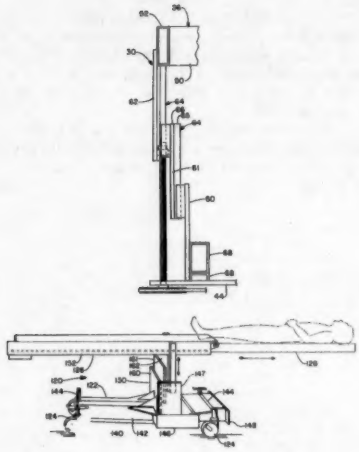
**Filed Sep. 1, 1994, Ser. No. 299,911**
**Int. Cl.[6] A61G** *7/012;7/05*
**U.S. Cl. 5—601** **6 Claims**

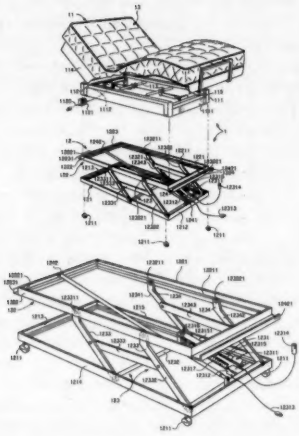
1. A mobile image table comprising:

(a) a lower frame member supported on rollers;

(b) a vertically movable upper frame members;

(c) a radiation permeable table top for supporting a patient, said table top being longitudinally movable between a first posi-





tion within a perimeter of said upper frame member and a second position in which a major portion of said table top extends beyond said perimeter of said upper frame member;

(d) a pair of linear bearing assemblies for guiding vertical movement of said upper frame member relative to said lower frame member, each of said linear bearing assemblies comprising a plurality of vertically extending rigid plates in telescoping relationship and comprising at least one pair of adjacent plates, said plates including a lowermost plate affixed to said lower frame member and an uppermost plate affixed to said upper frame member, and at least one vertically extending linear bearing associated with each pair of adjacent plates, each said vertically extending linear bearing comprising at least one slide means slidably connected to a guideway, wherein said slide means is affixed to one plate and said guideway is affixed to an adjacent plate; and

(e) drive means for raising and lowering said upper frame member.

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**5,490,298**

**MODULAR HIGH-LOW-ADJUSTABLE CONTOUR-ADJUSTABLE BED**

**Aaron Goldsmith, Long Beach, Calif., and Craig Adams, Medford, Oreg., assignors to Rosalyn Goldsmith, Wheeling, Ill.**

**Filed Feb. 8, 1994, Ser. No. 193,796**

**Int. Cl.[6] A61G** *7/00*

**U.S. Cl. 5—611** **11 Claims**

**4**. A high-low-adjustable contour-adjustable bed comprising;

a contour bed frame substantially in the shape of the side walls of a rectangular box having an open bottom and an open top,

a substantially planar bendable support member for supporting a mattress upon its upper surface, and

motorized means, located within the contour bed frame and affixed between this frame and the bendable support member, for variably bending the support member in order that a variable contour may be imparted to the mattress upon the support member's upper surface,

wherein the motorized means occupies less than the totality of the volume enclosed by the contour bed frame substantially in the shape of the topless and bottomless rectangular box, a portion of the volume enclosed by the contour bed frame being void and empty, and

a high-low base comprising:

a lower frame member supported upon a floor;

an upper frame member; and

elevation means for variably elevating the upper frame member in height above the lower frame member and above the floor upon which the lower frame member is supported;

wherein the upper frame member is of suitable complimentary size and shape so as to engage the contour bed frame so that this frame, and the entire contour bed, is variably elevated in height above the floor in accordance that the upper frame member is so elevated; and

wherein, nonetheless that the upper frame member engages the contour bed frame, the entirety of the (i) lower frame member, (ii) upper frame member, and (iii) elevation means fits substantially completely within the void of the volume enclosed by the contour bed frame upon such times as the elevation means places the upper frame member in its full down position.

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**5,490,299**

**SEATING SYSTEM WITH PRESSURE RELIEVING FLUID PAD**

**John C. Dinsmoor, III, Westminster, and Barry VanEveren, Loveland, both of Colo., assignors to Jay Medical Ltd., Boulder, Colo.**

**Continuation-in-part of Ser. No. 217,366, Mar. 24, 1994, which is a division of Ser. No. 945,733, Sep. 16, 1992, Pat. No. 5,352,023. This application Oct. 3, 1994, Ser. No. 316,732**

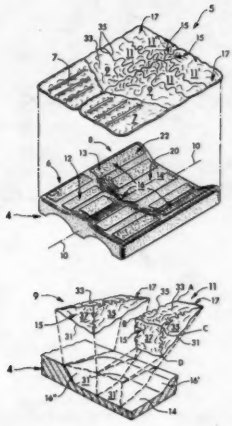
**Int. Cl.[6] A47C** *27/18;7/02*

**U.S. Cl. 5—654** **43 Claims**

**1**. A seating system primarily intended for use to relieve pressure and to reduce development of decubitus ulcers, said seating system including:

a relatively rigid, shaped tray extending along a central axis and having a depressed seating well with an upper surface intended to support the user's buttocks including the user's ischial tuberosities, said seating well having a bottom section and a rim section, each of said bottom and rim sections having an upper surface together forming at least part of the upper surface of said seating well wherein the upper surface of said bottom section extends substantially horizontally and outwardly on each side of a central vertical plane containing said central axis of said tray and wherein the upper surface of said rim section extends upwardly from the upper surface of said bottom section substantially at an inclined angle thereto, said upper surface of said bottom section being dimensioned to support at least the ischial tuberosities of the user's buttocks, and

a fluid pad having at least a first pouch substantially filled with fluid having a viscosity of at least one, said pouch being substantially wedge-shaped in cross section with said wedge



shape tapering down in vertical thickness from a thicker first end portion to a thinner second end portion, said wedge-shaped pouch being positioned in said seating well with the thicker first end portion of said wedge-shaped pouch substantially adjacent said central vertical plane containing the central axis of said substantially rigid tray and overlying at least a part of the upper surface of the bottom section of the seating well and with the thinner second end portion of said wedge-shaped pouch overlying at least a part of the inclined upper surface of the rim section of said seating well.

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**5,490,300**

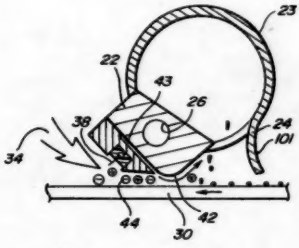
**AIR AMPLIFIER WEB CLEANING SYSTEM**

**Paul E. Horn, 2525 Sylvan Shore Dr., Waterford, Mich. 48328**

**Filed Apr. 25, 1994, Ser. No. 232,504**

**Int. Cl.[6] B08B** *5/02*

**U.S. Cl. 15—1.51** **16 Claims**



1. A web cleaning system comprising:

an air amplifying body connected to a source of compressed air for creating an increased volume flow of air along a surface of a web to be cleaned, by driving a relatively small volume of air from a slot in said body adjacent to the surface of the web to be cleaned in such an orientation that said small volume of air creates a larger volume flow along the surface of the web to be cleaned from an area between a portion of said body spaced away from said slot, and said web, the large volume flow between said area created by said small volume flow being at least equal to said small volume flow such that a ratio of said small volume flow to the larger volume flow through said area is at least 1:1; and

a vacuum source positioned adjacent to a downstream end of said amplifier body such that the air flow and any impurities that are removed from the surface of the web to be cleaned by the air flow may all be drawn into said vacuum source.

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**5,490,301**

**ROLLER BRUSH FOR SWEEPING MACHINES**

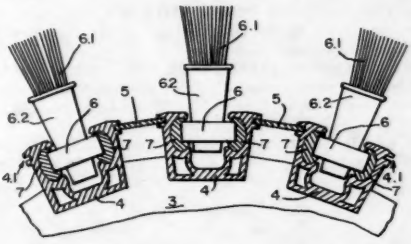
**Walter Droeser, and Hans Ekholm, both of Västerås, Sweden, assignors to Filippa I Vasteras Handesbolag, Vasteras, Sweden**

**Filed Nov. 18, 1994, Ser. No. 341,180**

**Claims priority, application Sweden, Nov. 19, 1993, 9303835**

**Int. Cl.[6] A46B** *7/10*

**U.S. Cl. 15—183** **3 Claims**



1. A roller brush for sweeping machines comprising a rotatable axle, carrying members mounted on said axle for rotation therewith, profile bars connected to said carrying members and being spaced a distance radially from said axle, each said profile bar extending in a direction parallel to said axle and having an exterior surface with a trough therein opening in a direction outwardly relative to said axle and extending parallel to said axle, said troughs each housing bristle members therein which protrude radially outwardly relative to said axle, said profile bars each having notches on opposite sides of the respective trough and each notch having an opening which is substantially normal to the respective trough and each notch further adjacent notch in an adjacent profile bar, said notches extending parallel to said axle, and a plurality of cover bars each being seated in a respective one of the pairs of facing notches of adjacent profile bars, said cover bars preventing dust or snow from lodging between adjacent profile bars.

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**5,490,302**

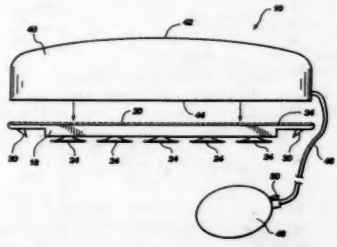
**DETACHABLY MOUNTED BACK WASHER WITH INFLATABLE BLADDER**

**William D. Dion, 7126 S. Shadow Cove, Salt Lake City, Utah 84121**

**Continuation-in-part of Ser. No. 238,387, May 5, 1994. This application Dec. 9, 1994, Ser. No. 352,571**

**Int. Cl.[6] A47K** *7/02*

**U.S. Cl. 15—210.1** **9 Claims**



1. A wall mounted back washer and applicator comprising:

a substantially rigid mounting plate including upper and under broad surfaces;

a plurality of suction cups disposed on the under broad surface of the plate, the suction cups staggered in rows for detachably mounting the back washer to the wall;

a plurality of continuous gripper ribs inset around the perimeter of the under broad surface of the plate for securing a standard-sized wash cloth to the washer about its upper broad surface; and

inflation and deflation means for selectively controlling the tautness of the wash cloth, the inflation and deflation means including an inflatable bladder securely attached to the upper broad surface of the plate.

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**5,490,303**

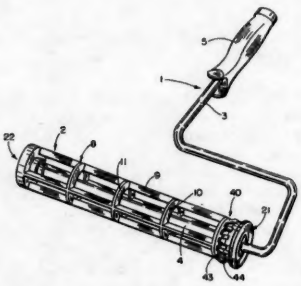
**PAINT ROLLER FRAME AND CAGE ASSEMBLY**

**Howard Graves, Berlin, Ohio, assignor to The Wooster Brush Company, Wooster, Ohio**

**Division of Ser. No. 86,192, Jun. 30, 1993, Pat. No. 5,345,648, which is a continuation of Ser. No. 800,430, Nov. 29, 1991, abandoned. This application May 25, 1994, Ser. No. 248,734**

**Int. Cl.[6] B05C** *17/02*

**U.S. Cl. 15—230.11** **9 Claims**



6. A paint roller frame and cage assembly said frame comprising a handle portion and a shaft portion, said cage assembly being mounted for rotation on said shaft portion, said cage assembly including rigid support means for uniformly supporting a roller cover thereon, said support means including a plurality of circumferentially spaced, axially extending support bars joined together by ribs extending between said support bars, a first flange extending axially from said support bars at one end of said support means, a first end cap extending over said first flange, a second flange extending axially from said support bars at the other end of said support means, a second end cap extending over said second flange, said second end cap having an outer diameter substantially corresponding to an annulus defined by radial outer edges of said support bars and said ribs to provide a continuation of said support means for supporting the roller cover thereon, and retaining means for retaining the roller cover on said support means.

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**5,490,304**

**FLOOR MOUNTED DOORSTOP**

**James E. Winner, Jr., Hollywood Beach, Fla., and L. David Carlo, Litchfield, Ohio, assignors to Winner International Royalty Corporation, Sharon, Pa.**

**Filed Apr. 5, 1994, Ser. No. 223,239**

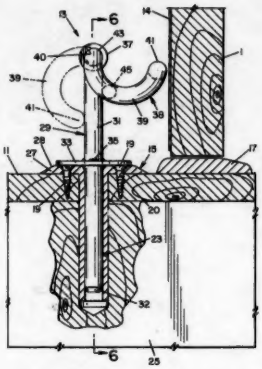
**Int. Cl.[6] E05F** *5/02*

**U.S. Cl. 16—82** **18 Claims**

1. An improved doorstop useful with a door to keep the door closed or alternatively to allow the door to be partially opened, said doorstop comprising:

a) a floor mounted receptacle adapted to be positioned in proximity to the closed door,

b) a removable base member received in said receptacle,



c) door contact means comprising a pair of parallel, spaced apart, arcuate members joined at one end by means cooperating with the arcuate members to form an elongated door contact surface and at other end by means pivotally engaging said base member, said door contact means pivotally movable from a first position in abutting contact with said door when closed to a second position allowing the door to be partially opened without removing said door contact means from said base member, and

d) movement arresting means defining the location of said door contact means when in the first position.

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**5,490,305**

**PERFECTED HINGE**

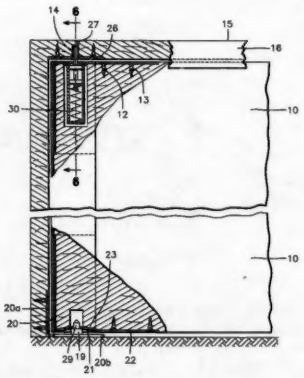
**Angel Domingo Ribot, Valles 42, Sta. Maria De Montcada, Spain**

**Filed Mar. 16, 1994, Ser. No. 213,631**

**Claims priority, application Spain, Mar. 16, 1993, 9300683 U**

**Int. Cl.[6] E05D** *7/10*

**U.S. Cl. 16—229** **5 Claims**



1. A hinge structure for pivotally mounting a door in a door frame, the door frame comprising a vertical door jamb rising from a floor and an overhead lintel, the door having a part-circular vertical edge portion, the hinge structure comprising a sprung stub extending outwardly from said vertical edge portion at a top edge of the door, a lower door plate with an aperture therein along a bottom edge of the door, said aperture located at said vertical edge portion of the door, an angular support for the door comprising a vertical plate with attachment means for securing the vertical plate to the door jamb and a horizontal plate to rest on the floor, a

support post on the horizontal plate and a pin extending from the post for receipt in said aperture in the lower door plate, said stub being adapted to be received in a cavity in the lintel.

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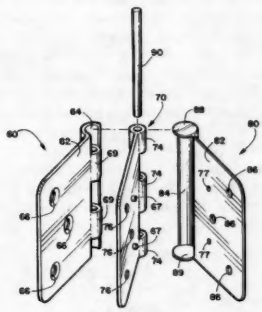
**5,490,306**

## HINGE AND SECURITY COVER PLATE ASSEMBLY

**Ted Floyd, 453 Grand Ave., Spring Valley, Calif. 91977, and Paul W. Hebert, 6450 Lake Shore Dr., San Diego, Calif. 92119**

**Filed Apr. 26, 1994, Ser. No. 233,253**
**Int. Cl.[6] E05D *11/00***
**U.S. Cl. 16—250** **5 Claims**



**1.** A security cover plate assembly for a barrel hinge comprising:

an inner cover plate having a top edge, a bottom edge, a left edge, a right edge; said inner cover plate having a flat wall portion and a curved wall portion that is located at said right edge, said curved wall portion having a front surface, a plurality of screw apertures are formed in said flat wall portion at positions that would align with the screw apertures of conventional barrel hinges;

a plurality of longitudinally spaced barrel sleeves are located on the front surface of said curved wall portion;

a conventional plate member having a top edge, a bottom edge, a left edge, and a right edge; said conventional plate member having a flat wall portion, a plurality of longitudinally spaced barrel sleeves are formed on the left edge of said flat wall portion and they are detachably interlockable between the respective longitudinally spaced barrel sleeves on the front surface of the curved wall portion of said inner cover plate, a plurality of screw apertures are formed in said flat wall portion at positions that would align with the screw apertures of said inner cover plate; and

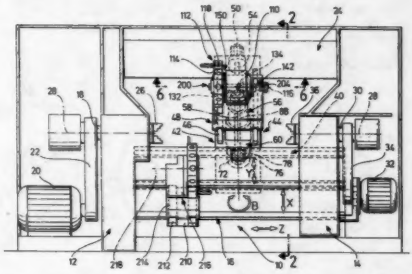
an outer cover plate having a top edge, a bottom edge, a left edge and a right edge; said outer cover plate having a flat wall portion and a curved wall portion that is located at said left edge, a plurality of screw apertures are formed in said flat wall portion at positions that would align with the screw apertures of conventional barrel hinges; a top wall of a predetermined configuration extends from the top edge of said outer cover plate over the top end of said curved wall portion to prevent access to a barrel hinge pin, a bottom wall of a predetermined configuration extends from the bottom edge of the outer cover plate over the bottom end of said curved wall portion to prevent access to a barrel hinge pin.

**5,490,307**

## LATHE

**Helmut F. Link, Aichwald, Germany, assignor to Index-Werke GmbH & Co. KG Hahn & Tessky, Esslingen, Germany**

**PCT No. PCT/EP92/02367, § 371 Date Apr. 5, 1994, § 102(e) Date Apr. 5, 1994, PCT Pub. No. WO93/07981, PCT Pub. Date Apr. 29, 1993**
**PCT Filed Oct. 14, 1992, Ser. No. 211,536**
**Claims priority, application Germany, Jan. 19, 1991, 41 34 615.7; European Pat. Off., Nov. 19, 1991, 91119675**
**Int. Cl.[6] B23B *29/32;7/14***
**U.S. Cl. 29—27 C** **28 Claims**



**1.** Lathe with a workpiece spindle (**18**) defining a Z-axis as well as a tool carrier slide (**56**) bearing a tool carrier in the form of a tool turret (**112**) having a turret body (**110**) and a turret head (**114**), said slide being displaceable in the direction of a first axis (X-axis) extending transversely to the Z-axis, whereby workpiece spindle (**18**) and tool carrier slide (**56**) are displaceable relative to one another in the direction of the Z-axis, the tool turret (**112**) is pivotable about a second axis (Y-axis) likewise extending transversely to the Z-axis as well as transversely to the X-axis and the turret head (**114**) is mounted on the turret body (**110**) so as to be rotatable about an indexing axis (**116**) extending transversely to the Y-axis, and first tool receiving means (**118**) on the turret head (**114**) as well as a second tool receiving means (**142**) borne by the turret body (**110**) and provided with a drive (**74, 88, 132**) for a drivable tool (**204**), characterized in that the second tool receiving means (**142**) is arranged directly on the turret body (**110**) on its side facing away from the turret head (**114**), that the turret head (**114**) has at least one first tool receiving means (**118**) provided with a drive (**74, 88, 132, 156, 152**) for a drivable tool (**154**) and that a common drive motor (**74**) is provided for all the drivable tools (**154, 204**).

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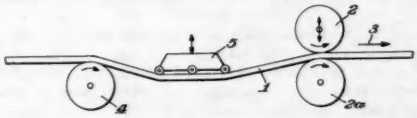
**5,490,308**

## MONITORING THE UNIFORMITY OF TOWS

**Bernd Huber, and Richard Neuert, both of Kelheim, Germany, assignors to Hoechst Aktiengesellschaft, Germany**

**Continuation of Ser. No. 716,057, Jun. 17, 1991, abandoned. This application Apr. 29, 1994, Ser. No. 235,185**
**Claims priority, application Germany, Jun. 19, 1990, 40 19 469.8**
**Int. Cl.[6] D01G *23/06***
**U.S. Cl. 19—239** **4 Claims**



**1.** A method for monitoring the uniformity of tows with mechanical sensing elements in the course of producing a tow line comprising the steps of transporting a tow at a predetermined speed by a roller arrangement, measuring tow tension upstream of

the roller arrangement, detecting any irregularity of the tow passing the roller arrangement by detecting tow tension increases and decreases, establishing predetermined positive and negative tow tension thresholds, indicating an irregularity in the tow when the measured tension exceeds either threshold, and triggering fault measures when either threshold is exceeded.

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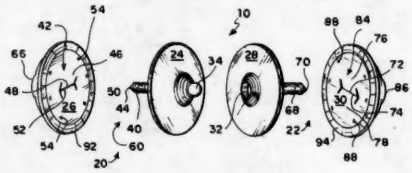
**5,490,309**
**FASTENER ASSEMBLY**

**Galilea F. Velasquez, 2501 E. 13th St., National City, Calif. 91950, and James R. Steier, 9212 Camino Largo Vista, Spring Valley, Calif. 91977**

**Filed Jul. 7, 1994, Ser. No. 271,777**
**Int. Cl.[6] A44B** *17/00*
**U.S. Cl. 24—90.1** **6 Claims**



**1**. A fastener assembly for joining fabric, said fastener assembly comprising:

a first pair of interlocking members including,

a first male member having an outside surface and an adjacent inside surface, said first male member including a first shank centrally extending from said inside surface, and

a first female member separate from said first male member, said first female member having an interior surface including a first shank acceptor for frictionally securing said first shank within said first female member, said first shank configured to penetrate the fabric to permanently secure the fabric between said first pair of said interlocking members;

a second pair of interlocking members including,

a second male member having an outside surface and an adjacent inside surface, said second male member including a second shank centrally extending from said inside surface, and

a second female member separate from said second male member, said second female member having an interior surface including a second shank acceptor for frictionally securing said second shank within said second female member, said second shank configured to penetrate the fabric to permanently secure the fabric between said second pair of interlocking members; and

coupling means for removably securing said first pair of interlocking members to said second pair of interlocking members, said coupling means including an engaging part extending from the outside surface of said first male member and a socket extending from the outside surface of said second male member, said socket frictionally and removably securing said engaging part therein.

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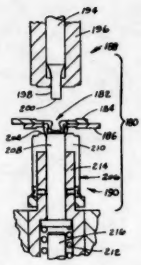
**5,490,310**
**APPARATUS AND METHOD FOR FORMING A CLINCH JOINT**

**Louis C. Schleicher, Warren, Mich., assignor to Tech-Line Engineering Co., Warren, Mich.**

**Division of Ser. No. 989,982, Dec. 11, 1992, Pat. No. 5,315,793, which is a continuation of Ser. No. 526,066, May 18, 1990, abandoned. This application Jan. 27, 1994, Ser. No. 188,391**
**Int. Cl.[6] B23P** *11/00*
**U.S. Cl. 29—243.5** **5 Claims**

**1**. A punch and die assembly for forming a leak proof joint to fasten a plurality of over-lapped sheets of deformable material together, said assembly comprising:



first and second coining dies aligned along a central axis and shiftable relative to one another to deform said sheets therebetween, said first coining die having a face perpendicular to the central axis and extending about a recess formed therein, said second coining die having an axial hole formed therethrough and a face perpendicular to and extending about said hole; and

a punch located within the second coining die central hole and shiftable axially relative thereto, said punch provided with a free end sized in relationship to the first coining die recess to enable the simultaneous drawing of the sheets into the recess without fracturing the sheet material to form a plurality of cup-shaped cavities nested one within the other, each having a central spot and a continuous wall region extending therefrom to the cavity periphery;

wherein the coining die faces are sized to press the region of the sheets surrounding the cavity periphery, subsequent to the withdrawal of the punch therefrom, to radially deform the sheets inwardly to securely interlock the cup-shaped cavities.

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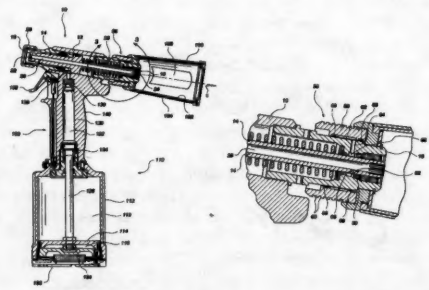
**5,490,311**
**ERGONOMIC INSTALLATION TOOL WITH SELECTABLE VACUUM PINTAIL COLLECTOR**

**Hendrik E. Rosier, Kingston, N.Y., assignor to Huck International, Inc., Kingston, N.Y.**

**Filed Sep. 8, 1994, Ser. No. 302,495**
**Int. Cl.[6] B21J** *15/22*
**U.S. Cl. 29—243.523** **29 Claims**



**1**. A tool for use in installing fasteners in workpieces, each fastener including a deformable head and a detachable pintail, each fastener capable of being installed by application to the fastener of an installation force which deforms the head and detaches the pintail, said tool being connectable to a nose assembly which is configured to apply an installation force, said tool comprising:

a nose piston cylinder;

a nose piston slidably disposed within said nose piston cylinder, said nose piston having a nose end and a tail end, said nose end of said nose piston being connectable to the nose assembly, said nose piston having a longitudinal bore connecting a nose orifice in said nose end with a tail orifice in said tail end, said nose piston also having a venturi bore which meets said longitudinal bore at a venturi orifice, such that air flowing

through said venturi orifice under sufficient pressure creates a venturi effect capable of drawing a detached pintail to and through said tail orifice, said venturi bore being connectable at an air feed to a source of pressurized air;

a slide valve disposed about the exterior of said nose piston cylinder between said venturi bore and said air feed, said slide valve being linearly slidable between an open position, which allows pressurized air to flow from said air feed to said venturi bore, and a closed position, which prevents air flow from said air feed to said venturi bore; and

means for pressurizing said nose piston cylinder.

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**5,490,312**

**RIVET SETTING TOOL**

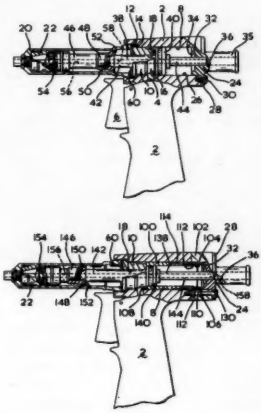
**Daniel R. Smith, Birmingham, United Kingdom, assignor to Emhart Inc., Newark, Del.**

**Filed Feb. 16, 1995, Ser. No. 391,401**

**Claims priority, application United Kingdom, Feb. 19, 1994, 9403220**

**Int. Cl.[6] B21J** *15/20*

**U.S. Cl. 29—243.525** **4 Claims**



**1**. A blind rivet setting tool which is convertible between operation with a shorter, more powerful stroke and a longer, less powerful stroke comprising:

a tool body comprising a supply orifice and a bore into which said orifice opens

means for supplying hydraulic fluid under pressure through said orifice

a first head member closing a forward end of said bore and having an axial passage therethrough and provided with a forward end face

a second head member closing a rearward end of said bore and having an axial exit passage therethrough

a piston chamber formed in the bore between said two head portions

an outer barrel attached to said tool body

a collet head slidably mounted in said outer barrel

said tool also comprising two sets of parts, a first set, for such shorter stroke operation, comprising

a piston rod having a piston which fits into said tool body bore and comprising a forward portion adapted to be slidably mounted in the axial passage of the first head member and a rearward portion adapted to be slidably mounted in the axial exit passage of the second head member

an extension member comprising a rear end portion adapted to be secured to the forward end portion of the piston rod, and a forward end portion adapted to be secured to the collet head,

the arrangement being such that when the first set of parts is assembled in the tool and the tool is operated, hydraulic fluid is admitted through the supply orifice into said bore in front of the piston which is then caused to perform an operating stroke whose length is determined by the distance between the rear end portion of the extension member and said forward end face of the first head member

and a second set of parts for longer stroke operation comprising

an extension collar adapted to be secured to the tool body between the tool body and the second head member and having an axial bore which extends the bore in the tool body

a sleeve adapted to fit into said bore of said tool body and to extend between the first head member and the extension collar

a piston rod bearing a piston which fits into the sleeve, said rod comprising a forward portion adapted to be slidably mounted in the axial passage of said first head member and a rearward portion adapted to be slidably mounted in said axial exit passage of the second head member

an extension member comprising a rear end portion adapted to be secured to the forward end portion of the piston rod and a forward end portion adapted to be secured to the collet head

the arrangement being such that when the second set of parts is assembled in the tool and the tool is operated, hydraulic fluid is admitted through the supply orifice into the sleeve in front of the piston which is then caused to perform an operating stroke whose length is determined by the distance between the rear end portion of the extension member and said forward end face of the first head member

the product of the stroke of the piston and the area of the piston exposed to hydraulic pressure being substantially equal in the tool assembled with either set of parts.

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**5,490,313**

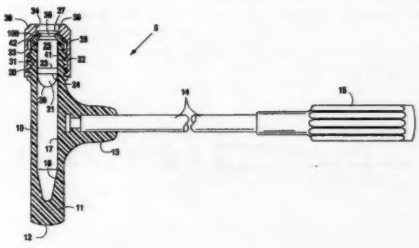
**BULLET PULLER**

**Clifford L. Ashbrook, Spicewood, Tex., assignor to Quinetics Corporation, San Antonio, Tex.**

**Filed Jan. 7, 1994, Ser. No. 178,769**

**Int. Cl.[6] B25B** *27/14*

**U.S. Cl. 29—275** **8 Claims**



**1**. A bullet puller, comprising:

a carrier tube having an opening at its upper end adapted to receive a cartridge and a closed lower end adapted to be struck against a hard surface, wherein the upper end of said carrier includes a plurality of slots cut therein;

a plurality of annular segments disposed within said plurality of slots at the upper end of said carrier, said plurality of annular segments adapted to engage the cartridge;

cam means removably mounted over said opening at said upper end of said carrier for moving said plurality of annular segments radially inward;

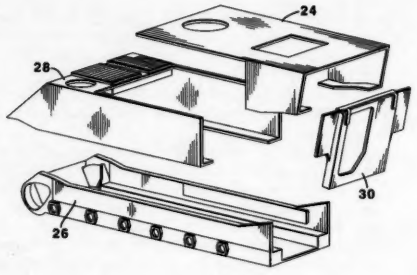
handle means connected at one end to said carrier for imparting motion to said carrier for striking it against the hard surface.

5,490,314

## STRETCH VEHICLE CONVERSION METHOD

Matthew G. Riddle, 7013 Noonwood Ct., San Jose, Calif. 95120

Filed Oct. 20, 1994, Ser. No. 325,754
Int. Cl.[6] B21K *21/16*
U.S. Cl. 29—401.1 6 Claims




1. An overhaul and conversion method for an armored vehicle of the M113 family comprising the steps of:

providing an armored vehicle of the M113 type;

said armored vehicle comprising a rear plate, upper plate, upper hull, and lower hull;

removing said rear plate from said armored vehicle;

removing said lower hull from said armored vehicle;

discarding said lower hull and said lower plate;

fabricating a new lower hull;

fabricating a new top plate with side wall extensions;

modifying said upper hull to form a new upper hull;

modifying said rear plate to form a new rear plate; and

welding and joining together said new lower hull, said top plate, said new upper hull and said new rear plate to form a new vehicle structure.

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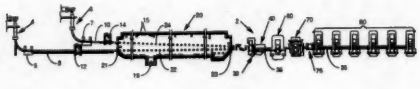
5,490,315

## METHOD AND APPARATUS FOR CONTINUOUSLY HOT ROLLING STRIP

Peter Kostopolos, and Giuseppe Facco, both of Pittsburgh, Pa., assignors to Italimpianti of America, Inc., Coraopolis, Pa.

Filed Jan. 21, 1994, Ser. No. 181,761
Int. Cl.[6] B21B *1/46*
U.S. Cl. 29—527.7 18 Claims



1. Apparatus for continuous manufacture of hot rolled strip comprising:

continuous casting means for producing slabs;

furnace means for heating the slabs to a rolling temperature;

scarfing means to further heat the slabs upon discharge from the furnace means;

means for overlapping a head end of a trailing slab and a tail end of a leading slab or a transfer bar, including means for raising the head end of the trailing slab and for accelerating the trailing slab, whereby, the head end of the trailing slab overlaps the tail end of the leading slab or transfer bar;

slab mill means for hot rolling said scarfed and overlapped slab ends to fusion weld said ends together to form a welded transfer bar; and

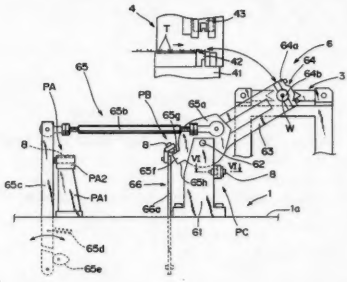
hot strip mill means to finish roll the welded transfer bar to a finish strip gauge.

5,490,316

## CONTINUOUS TERMINAL CRIMPING MACHINE

Koichi Kimoto, Kanazawa, Japan, assignor to Sumitomo Wiring Systems Ltd (a corp. of Japan), Mie, Japan

Filed Jun. 8, 1994, Ser. No. 257,015
Claims priority, application Japan, Jun. 11, 1993, 5-140877
Int. Cl.[6] H01R *43/04*
U.S. Cl. 29—564.4 12 Claims




1. A continuous terminal crimping machine comprising:

electric wire feeding means for feeding an insulated electric wire along a feeding path;

cutting means for cutting the electric wire fed on said feeding path by said feeding means;

stripping means for stripping an end of the electric wire which has been cut on said feeding path by said cutting means;

a terminal crimping apparatus, disposed beside said feeding path, for crimping a terminal onto the end of the electric wire stripped by said stripping means;

a rotatable arm having a clamping portion for releasably clamping the end of said electric wire stripped by said stripping means, said rotatable arm being rotatable around a predetermined axis parallel to said feeding path between a first position where the end of the electric wire clamped by said clamping portion is placed at a predetermined position on said feeding path, and a second position where the clamped end of the electric wire is placed at a predetermined crimping position, said terminal crimping apparatus crimping the terminal onto the clamped end of the wire at said crimping position;

a rotating mechanism for alternately rotating said rotatable arm to said first position and said second position, said rotating mechanism including a swing lever, linking means for connecting said swing lever to said rotatable arm, urging means for urging said swing lever in a direction, and rotatable eccentric cam means for pushing said swing lever in a direction opposite to said direction of urging by said urging means when said cam means rotates; and

shock absorbing means opposed to a predetermined portion of at least one of said rotatable arm and said displaceable member, said shock absorbing means absorbing shock to dampen vibration of the electric wire as said rotatable arm is stopped at said second position.

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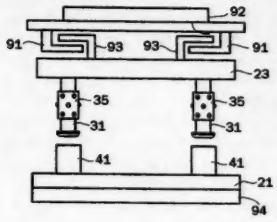
5,490,317

## TAPERED ALIGNMENT GUIDE ARRANGEMENT FOR SELF ALIGNING PART EXCISION DIE MEMBERS IN TAPE AUTOMATED BONDING APPARATUS

Vincent T. Kubert, Melbourne, Fla., assignor to Microtek Industries, Inc., Palm Bay, Fla.

Filed Jun. 16, 1994, Ser. No. 260,756
Int. Cl.[6] B23Q *5/54;* B23P *23/04*
U.S. Cl. 29—564.7 7 Claims

1. For use with a part-forming apparatus having a part-forming station to which a part to be excised from a part carrier is transported, and a part excising device located at said part forming station and being operative to excise said part from said part




carrier, said part forming station comprising a first die member and a second die member, which is to be mutually aligned with and brought into engagement with said first die member in order to excise said part from said part carrier, an arrangement for causing said first die member to undergo self-aligned engagement with said second die member, said arrangement comprising a plurality of alignment bearing shafts mounted on said first die member and having a plurality of bearing-containing sleeves slidably translatable along said alignment bearing shafts, and a plurality of bushings that are mounted on said second die member and are sized to receive respective ones of said plurality of bearing-containing sleeves of said alignment bearing shafts of said first die member, and thereby mutually align said first and second die members, so that said part may be excised thereby, a respective alignment bearing shaft of said first die member having an alignment element located at a terminal end thereof, said alignment element being tapered and sized to guide said respective alignment bearing shaft into said respective bushing, and wherein said first die member is supported at said part-forming station relative to said second die member so as to effectively mechanically float relative to said second die member, and thereby permit said first die member to be translated transverse to axes of said plurality of bushings mounted on said second die member, and facilitate entry of respective alignment elements into respective bushings.

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**5,490,318**

## METHOD FOR THE MANUFACTURE OF STATOR-OR-ROTOR-WINDINGS FOR ELECTRICAL MACHINES FROM PARALLEL-WIRES

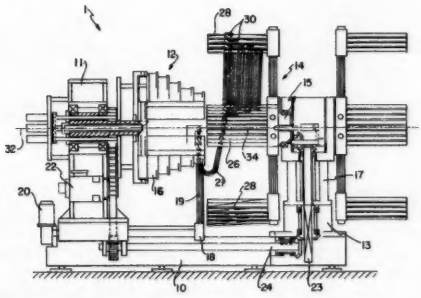
**Dieter Kleinschmidt, Karben, Germany, assignor to Elmotec GmbH, Karben, Germany**

**Filed Jun. 14, 1993, Ser. No. 76,802**

**Claims priority, application Germany, Jun. 15, 1992, 42 19 374.5; Jun. 15, 1992, 42 19 594.2**

**Int. Cl.[6] H02K** *15/06*

**U.S. Cl. 29—596** **10 Claims**




1. A method for manufacturing of rotor or stator windings for electrical machines comprising the steps of:

winding a plurality of parallel wires to form at least two groups of coils on a rotating jig by rotating the jig and drawing the plurality of parallel wires from a stationary feed device, which is located in a peripheral direction with respect to the jig; and

transferring a finished wound groups of coils from the jig to a coil receiver so that at least two groups of coils are transferred consecutively from the jig to the coil receiver and such that for each group of coils, the coil receiver is rotated to a different angular position with respect to the jig.

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**5,490,319**

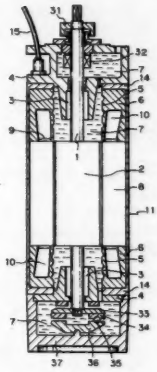
## THERMOTROPIC LIQUID CRYSTAL POLYMER COMPOSITION AND INSULATOR

**Toshio Nakamura; Yoshimi Soeda; Toshifumi Miyasaka, and Minoru Iwata, all of Kanagawa, Japan, assignors to Ebara Corporation, Tokyo, Japan**

**Continuation-in-part of Ser. No. 106,873, Sep. 28, 1993, which is a division of Ser. No. 9,945, Jan. 27, 1993, abandoned. This application Aug. 3, 1994, Ser. No. 285,278**

**Int. Cl.[6] H02K** *15/00;1/04;15/12;15/14*

**U.S. Cl. 29—596** **3 Claims**




1. A method for preparing a resin molded stator of a submersible motor comprising the steps of:

mixing about 10–13 percent by weight of a thermoplastic liquid crystalline polymer resin with about 90–87 percent by weight of zircon comprising particles of about 1–60 μm in size while heating at a temperature of about 260°–330° C. to form pellets comprising a homogenous thermotropic polymer composition; and

performing injection molding with the pellets at a temperature of about 260°–330° C. through two stages, the first stage in which the slots in the stator core and the space around the coil end portions at opposite ends of the core are filled with a resin composition at a pressure of 600–1400 kgf/cm$^2$ and the second stage in which a can, a frame and frame side plates are mounted on the thus produced stator core to form a submersible motor and the resulting space around the coil end portions is filled with a resin composition at a pressure of 400–700 kgf/cm$^2$.

**5,490,320**

## METHOD OF MAKING A POSITIVE ELECTRODE FOR LITHIUM SECONDARY BATTERY

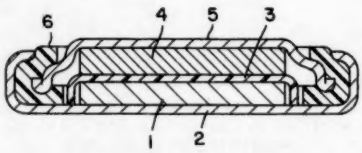
**Masaki Hasegawa; Yasuhiko Bito, both of Osaka; Shuji Ito, Akashi; Hiroyuki Murai, and Yoshinori Toyoguchi, both of Osaka, all of, Japan, assignors to Matsushita Electric Industrial Company, Ltd., Osaka, Japan**

**Filed Jun. 4, 1993, Ser. No. 72,971**

**Claims priority, application Japan, Jun. 4, 1992, 4-143980; Aug. 4, 1992, 4-207732; Sep. 11, 1992, 4-242920; Dec. 8, 1992, 4-327652**

**Int. Cl.[6] H01M** *4/32;4/26*

**U.S. Cl. 29—623.1** **4 Claims**




1. A method of making a positive electrode for a lithium secondary battery wherein said electrode comprises a double oxide of lithium and nickel said method comprising the steps of

burning a mixture of lithium nitrate in combination with at least one nickel compound selected from the group consisting of nickel carbonate and nickel hydroxide, wherein the atomic ratio of Li/Ni in said mixture is from greater than 1.0 to 1.4, at a temperature in the range of 620° to 680° C. to obtain a black burned powder; and

adding a conductive agent and a binder to said powder to form said positive electrode.

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**5,490,321**

## APPARATUS AND METHOD FOR REMOVING A STOPPER

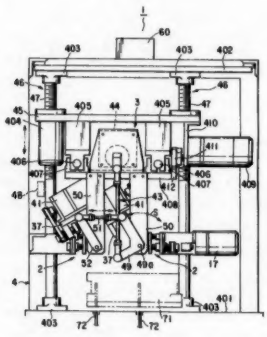
**Hiroyuki Kaneko, Tokyo, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan**

**Filed Apr. 25, 1994, Ser. No. 232,684**

**Claims priority, application Japan, May 11, 1993, 5-109393**

**Int. Cl.[6] B23P** *17/00*

**U.S. Cl. 29—714** **15 Claims**




1. A stopper removing device for removing a sealing stopper fitted in a material holding container, comprising:

a device body;

container holding means, provided on the device body, for immovably holding a material holding container in place;

a movable member, movable in an upward and a downward direction over the container holding means;

grasping means, swingably attached by a link mechanism to the movable member, for grasping a sealing stopper;

linear drive means for driving the movable member in the upward direction with the sealing stopper grasped by the grasping means, and for imparting a pull-up force to the sealing stopper; and

swinging motion drive means for swinging the grasping means with the sealing stopper grasped by the grasping means and for imparting a twist force to the sealing stopper;

said grasping means comprising:

support members swingably attached by the link mechanism to the movable member;

a support mounted to the support members and which is elastically displaceable in the downward direction;

chucking claw members having claws at respective forward end portions thereof, said claws being engageable with the sealing stopper and said claw members being pivotable at respective intermediate positions thereof on lower end portions of the support members, the claws at the forward end portions of said chucking claw members being openable and closable;

urging means, provided on a back side of the chucking claw members, for elastically urging the chucking claw members in a direction in which the claws at the forward end portions of the chucking claw members are closed; and

drive means, provided on the support, for driving the chucking claw members in a direction in which the claws at the forward end portions of the chucking claw members are opened against an urging force of the urging means.

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**5,490,322**

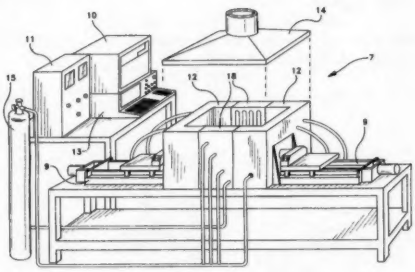
## GAS TURBINE ENGINE VANE ASSEMBLY REPAIR APPARATUS

**Frank J. Goodwater, Carson; Lang D. Huynh, and David S. Kang, both of Carson City, all of Nev., assignors to Chromalloy Gas Turbine Corporation, San Antonio, Tex.**

**Division of Ser. No. 238,317, May 5, 1994, Pat. No. 5,444,911. This application Jun. 16, 1995, Ser. No. 438,068**

**Int. Cl.[6] B23P** *15/00*

**U.S. Cl. 29—722** **6 Claims**




1. Apparatus for separating a platform from an airfoil of a gas turbine engine brazed vane assembly comprising:

a heating means for preheating the assembly and maintaining the assembly at a predetermined temperature during the separation of the platform from the airfoil;

a first fixture means for gripping the inner platform of the vane assembly and a second fixture means for gripping the outer platform of the vane assembly;

a motion system for applying opposing motion and force to the first and second fixture means and to the platforms gripped thereby to separate the airfoil from the platform.

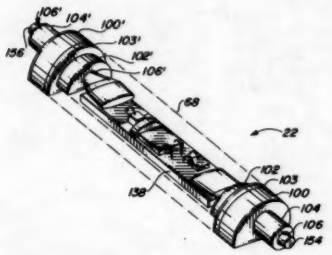
## 5,490,323
## METHOD FOR MAKING A BODY IMPLANTABLE SENSOR

**James R. Thacker, Lake Jackson, Tex.; Alvin H. Weinberg, Moorpark, and Shahram Moaddeb, West Hills, both of Calif., assignors to Pacesetter, Inc., Sylmar, Calif.**

**Division of Ser. No. 68,454, May 28, 1993, Pat. No. 5,438,987, which is a continuation-in-part of Ser. No. 716,032, Jun. 14, 1991, Pat. No. 5,267,564. This application Jan. 30, 1995, Ser. No. 380,764**

**Int. Cl.[6] H01R** *43/00*

**U.S. Cl. 29—625** **18 Claims**




1. A method for making a body implantable optical sensor, the method comprising the steps of:

forming a D-shaped, optically clear, tubular shell;

mounting the sensor onto the flat inner surface of the D-shaped shell;

forming two end caps dimensioned to seal the open ends of the shell, each end cap being formed to pass a sensor terminal;

forming a sealing ring about one end of each of the end caps;

heating the two end caps until the sealing ring reflows to form a hermetic seal; and

heating the two end caps until the sensor terminals are hermetically sealed to the end caps.

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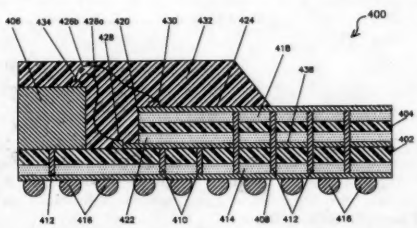
## 5,490,324
## METHOD OF MAKING INTEGRATED CIRCUIT PACKAGE HAVING MULTIPLE BONDING TIERS

**Keith G. Newman, Sunnyvale, Calif., assignor to LSI Logic Corporation, Milpitas, Calif.**

**Filed Sep. 15, 1993, Ser. No. 121,675**

**Int. Cl.[6] H05K** *3/36*

**U.S. Cl. 29—830** **11 Claims**




1. A method for fabricating an integrated circuit package, comprising:

(a) laminating printed wiring boards to one another, some of the printed wiring boards having consecutively larger openings so as to form a cavity having two or more bonding tiers, the two or more bonding tiers having contact pads disposed thereon;

(b) placing a semiconductor die in the cavity, the semiconductor die including bond pads thereon;

(c) connecting the bond pads of the semiconductor die to the contact pads;

(d) attaching external connection means to one or more of the laminated printed wiring boards;

(e) connecting the contact pads to the external connection means;

(f) placing the semiconductor die and laminated printed wiring boards within a particular one of a plurality of molding cavities, each of the plurality of molding cavities being connected to a central container by a plurality of respective paths;

(g) placing molding compound within the central container;

(h) heating and pressurizing the central cavity so as to force the molding compound to flow from the central container, through the plurality of respective paths, and into the particular molding cavity; and

(i) permitting the molding compound to harden within the particular molding cavity so as to encapsulate the semiconductor die and laminated printed wiring boards with molding compound.

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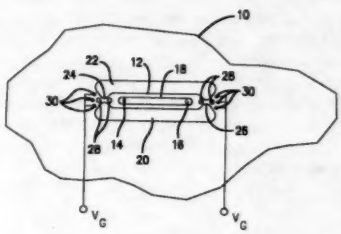
## 5,490,325
## GUARDED PRINTED CIRCUIT BOARD ISLANDS

**James A. Niemann, Monroe Falls, and George Topala, Lakewood, both of Ohio, assignors to Keithley Instruments, Cleveland, Ohio**

**Filed Sep. 30, 1994, Ser. No. 315,607**

**Int. Cl.[6] H05K** *3/02*

**U.S. Cl. 29—846** **3 Claims**




1. A method for providing on a printed circuit board a component connection area of said board having low dielectric absorption, comprising:

creating at least one component electrical connection point within said connection area; and

creating one or more apertures in said board, said one or more apertures completely surrounding said connection area except for one or more narrow stems between said connection area and said board, said stems having an aggregate width substantially smaller than the perimeter of said connection area.

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## 5,490,326
## METHOD OF RETROFITTING FLUORESCENT LIGHT FIXTURES AND PUNCH AND DIE ASSEMBLY THEREFOR

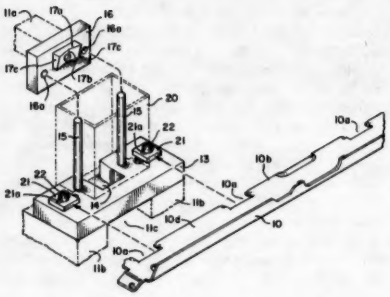
**Lyman O. Nielson, 2183 Window Pl., St. George, Utah 84770**

**Filed Mar. 1, 1994, Ser. No. 203,940**

**Int. Cl.[6] H01R** *43/00;* **B21B** *15/00*

**U.S. Cl. 29—876** **5 Claims**

1. A method of retrofitting fluorescent lighting fixtures for the installation of electrical sockets at locations along edge margins of trougher raceways of such fixtures previously not prepared to receive such electrical sockets, comprising inserting the previously notched edge margin of the trougher raceway concerned in a punch and die press equipped with a punch and die assembly capable of notching such edge margin and with work placement guide means arranged laterally of the punch and die components of said assembly so that said work placement guide means extend into existing



notches of said edge margin of the trougher raceway concerned in abutting relationship with portions thereof that establish the proper setting for the punch and die components of said assembly in punching out a required new electrical socket-receiving notch in the trougher raceway concerned; and operating said punch and die press to punch out said required new notch in said trougher raceway concerned.

3. A punch and die assembly for use in a punch and die press for retrofitting fluorescent lighting fixtures to receive new electrical sockets at locations along notched edge margins of trougher raceways thereof previously not prepared to receive such electrical sockets, comprising cooperating punch and die components capable of notching such an edge margin; and work placement guide means arranged laterally of said components for fitting into existing notches of the edge margin of the trougher raceway concerned in respective positions therein that establish a proper setting for the punch and die components of the punch and die assembly in punching out the required new electrical-socket-receiving notch in the trougher raceway concerned.

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**5,490,327**

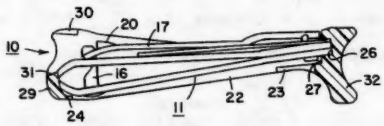
**RETAINER FOR A NAIL CLIPPER**

**Hiroshi D. Ohori, P.O. Box W, Cedar Knolls, N.J. 07927**

**Filed Nov. 21, 1994, Ser. No. 342,578**

**Int. Cl.[6] A45D** *29/02*

**U.S. Cl. 30—28** **20 Claims**



13. In combination,

a nail clipper having a pair of elongated legs secured together at a rear end, each of said legs having a jaw at an opposite end facing a jaw of the other of said legs; and

a retainer having said nail clipper removably mounted therein for movement between a recessed position and an operating position, said retainer including a rear end receiving said rear end of said nail clipper in said recessed position, a wall at a forward end for positioning in front of said jaws in said recessed position and spaced from said jaws in said operating position of said nail clipper and stop means for retaining said nail clipper in said retainer in said operating position.

**5,490,328**

**DRY SHAVER**

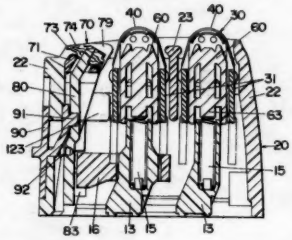
**Yasunori Ueda, Hirata, and Kiyotaka Otsuka, Sugoshi, both of, Japan, assignors to Matsushita Electric Works, Ltd., Osaka, Japan**

**Filed May 23, 1994, Ser. No. 247,583**

**Claims priority, application Japan, May 31, 1993, 5-129537**

**Int. Cl.[6] B26B** *19/04*

**U.S. Cl. 30—43.92** **6 Claims**



1. In a dry shaver comprising:

a housing:

a head frame mounted on said housing and supporting a shaving head including

(a) an elongated outer shearing foil in a floating manner, said head frame formed with a stopper defined at the top of the head frame so that said stopper is disposed at a first height, and said head frame surrounding the shearing foil and adapted to come into contact with a user's skin and

(b) an inner cutter in longitudinally reciprocating hair shearing engagement with said outer shearing foil;

a drive element connected to reciprocate said inner cutter relative to said outer shearing foil;

said outer shearing foil being supported to said head frame by spring means which urge said inner cutter against the outer shearing foil, bias the outer shearing foil upwardly beyond the stopper and allow said outer shearing foil to be depressed to a second height which is no higher than said first height, so that when said outer shearing foil is depressed at a given portion by contact with the user's skin, an upper end of said depressed portion of said outer shearing foil is displaceable downwardly beyond said stopper such that said stopper comes into contact with the skin for bearing a depressing force acting on said outer shearing foil;

said dry shaver including more than one shaving head which is a combination of said outer shearing foil, said inner cutter and said drive element, said shaving heads being arranged in spaced parallel relation within said head frame, said head frame having a rib extending between the outer shearing foils of the adjacent shaving heads so as to define a part of said stopper.

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**5,490,329**

**SHAVING SYSTEM**

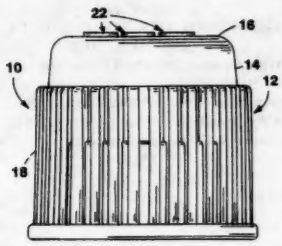
**Henryk J. Chylinski, Haverhill; Chester F. Jacobson, Southboro; Timothy M. Salisbury, Pembroke, and Frederick R. Borden, Brockton, all of Mass., assignors to The Gillette Company, Boston, Mass.**

**Filed May 17, 1994, Ser. No. 245,245**

**Int. Cl.[6] B26B** *21/00*

**U.S. Cl. 30—49** **18 Claims**

1. A shaving system of the wet shave type comprising support structure and blade structure secured to said support structure, said blade structure having an aperture that defines an annular sharpened shaving edge that is defined by main facet portions that converge at an angle of less than 40°, and supplemental facet portions that are extensions of said main facet portions and converge at an included angle greater than said main facet portions and less than 60° to define an annular ultimate tip portion that is




disposed within a boundary region defined by imaginary line extensions of said main facet portions, said annular ultimate tip defining a shaving plane and the bisector of the included angle defined by said supplemental facet portions being disposed at an angle (shaving angle) in the range of 15°–35° to said shaving plane.

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**5,490,330**

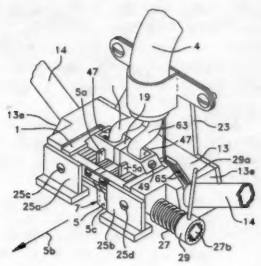
**CUTTING HEAD STABILIZER FOR TIRE GROOVER**

**Guy A. Van Alstine, 27 W. Cherry Ave., Trappe, Pa. 19426**

**Continuation of Ser. No. 19,201, Feb. 18, 1993, abandoned, which is a continuation-in-part of Ser. No. 812,103, Dec. 23, 1991, abandoned. This application Sep. 14, 1994, Ser. No. 305,863**

**Int. Cl.**[6] **B29D** *30/68*

**U.S. Cl. 30—140** **24 Claims**




**1**. An apparatus for cutting a tire groove in the road gripping surface of a tire comprising:

stabilizer means for guiding a cutting head member in a cutting direction at a substantially constant angle along the road gripping surface of the tire;

the stabilizer means having a substantially planar surface for slidably engaging the road gripping surface of the tire;

the substantially planar surface having a forward edge and a rearward edge;

the cutting head member having a blade for cutting through the tire in the cutting direction;

the blade having a cutting edge and a back edge; and

the forward edge being positioned in front of a reference line normal to the cutting direction passing through the cutting edge of the blade, the rearward edge being positioned substantially even with a reference line normal to the cutting direction passing through the back edge of the blade.

**5,490,331**

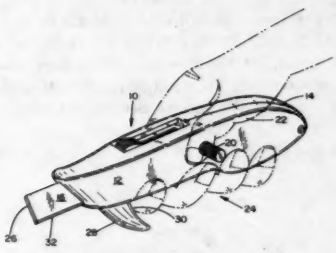
**UTILITY KNIFE FOR CUTTING AND SCRAPING**

**Peter Gold, 465 N. Wood Rd., Rockville Centre, N.Y. 11570**

**Filed May 26, 1995, Ser. No. 451,460**

**Int. Cl.**[6] **B25F** *3/00*

**U.S. Cl. 30—143** **1 Claim**




**1**. Improvements for cutting directionally toward and scraping directionally away from a user of a utility knife having screw-attached cooperating left and right housings bounding a storage compartment therebetween for a retractable blade adapted to be projected from a front end of said housings incident to said housings serving as a hand grip during the use of said blade, said improvements for said cutting comprising a first honed edge on said blade in facing relation from above to a below-positioned substrate adapted to be cut incident to a directional cutting stroke toward a user, and a screw for attaching said housings together characterized by a cylindrical head of not less than ½ inch in axial length extending laterally of said utility knife so as to serve as a grip for a thumb of a user's hand grip disposed thereabout to facilitate pulling said utility knife during said directional cutting stroke, and said improvements for said scraping comprising a second honed edge on said blade in transverse relation to a directional scraping stroke away from a user, and a finger-contact means attached in depending relation adjacent said front end of said utility knife to facilitate pushing said utility knife during said directional scraping stroke, whereby said utility knife has enhanced utility for cutting and scraping.

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**5,490,332**

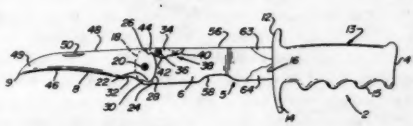
**EXTENDABLE GUTTING KNIFE**

**John M. Levin, 412 Fairview Rd., Narberth, Pa. 19072**

**Filed Mar. 9, 1994, Ser. No. 208,510**

**Int. Cl.**[6] **B26B** *1/06*

**U.S. Cl. 30—161** **23 Claims**




**1**. A knife comprising a handle, with a handguard, a retractable and extendable blade, a blade retaining member independent of said handle and having a length equal to at least the length of said blade and having a first and a second end, said handle being connected to said retaining member at said first end, and means for retracting and extending said blade comprising a first pivot at said second end, to which said blade is connected said retaining member comprising a slot therein into which said entire blade is

retracted, and said blade being distanced apart from said handle by approximately the length of said retaining member when said blade is extended.

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**5,490,333**

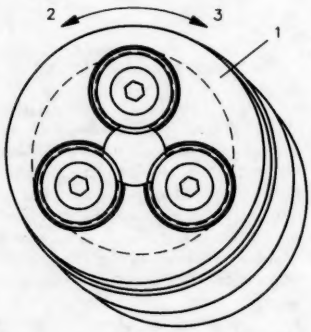
**THREE POINT TRI-ROLL THREADED RING GAUGE THAT IS ADJUSTABLE WITH WEAR DETECTORS**

**Russell Nelson, 161 Newbury St., #29, Peabody, Mass. 01960, and John LeBlanc, 141 Bacon St., Natick, Mass. 01760**

**Filed Feb. 1, 1994, Ser. No. 191,270**

**Int. Cl.[6] G01B** *3/48*

**U.S. Cl. 33—199 R** **10 Claims**




1. A gauge to measure round objects where an annular cam ring with an inner surface diameter has three cam segments at repeating intervals cut into the inner surface of said annular cam ring, said cut ranging from said surface to a maximum depth then is blended back into the inner surface diameter of said annular cam ring, and where a first roller is in contact with a first cam of said segments, said first roller attached to a first arm which is pivotably located by first pivoting means and which holds one end of said first roller by holding means such that said first roller is in contact with said first cam surface and may sildably move in contact with said first cam surface and where said first roller is contained within a housing means which locates the axis of said first roller in a position parallel to the axis of said first cam surface, and allows direct contact with both said first cam surface and a part, and where a second roller is in contact with a second cam segment and said second roller is attached to a second arm which is pivotably located by second pivoting means and which holds one end of said second roller by said holding means such that said second roller is in contact with said second cam surface and may slidably move in contact with said second cam surface and where said second roller is contained within a said housing means which locates the axis of said second roller in a position parallel to the axis of said second cam surface, and allows direct contact with both said first cam surface and a part, and where a third roller is in contact with a third cam segment and said third roller is attached to a third arm which is pivotably located by third pivoting means and which holds one end of said third roller by said holding means such that said third roller is in contact with said third cam surface and may slidably move in contact with said third cam surface and where said third roller is contained within said housing means which locates the axis of said third roller in a position parallel to the axis of said third cam surface, and allows direct contact with both said third cam surface and a part and where each said pivoting means is held in place by a pin attaching it to said arms.

**5,490,334**

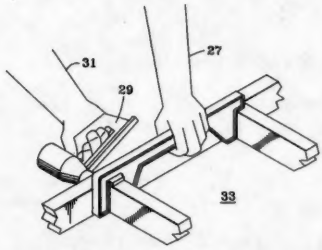
**SPEED HAND TOOL FOR STUDS, JOISTS, RAFTERS, AND THE LIKE**

**Douglas Payne, Groton Heights, Vt., assignor to Frame Master, Inc., Wells River, Vt.**

**Continuation of Ser. No. 967,802, Oct. 27, 1992, abandoned, which is a continuation-in-part of Ser. No. 846,384, Mar. 5, 1992, abandoned. This application Dec. 6, 1994, Ser. No. 350,581**

**Int. Cl.[6] G01D** *21/00*

**U.S. Cl. 33—613** **18 Claims**




1. A tool (**20**) for spacing and manipulating studs while installing between header and footer (**26**), the studs having a width W and spaced at a predetermined distance D, the tool (**20**) comprising:

an elongated body member (**21**) having a first end, a second end and an axis of elongation;

a cradle (**23**) attaching to said first end of said elongated body member (**21**) having,

a first jaw (**63**) spaced apart from a second jaw (**65**) by a distance sufficient to accommodate the stud of width W, said first jaw (**63**) and said second jaw (**65**) having a horizontal cradle face (**62**) therebetween, said first jaw (**63**) and said second jaw (**65**) being positioned substantially normal to said axis of elongation;

a shoulder (**25**) attaching to said second end of said elongated body member (**21**) and spaced apart from said second jaw (**65**) by the predetermined distance D, said shoulder (**25**) having,

a shoulder jaw (**51**) and a horizontal shoulder face (**46**), said shoulder jaw (**51**) being spaced apart from said first jaw (**63**) and said second jaw (**65**) and being substantially normal to said axis of elongation; and

further wherein said first jaw (**63**), said second jaw (**65**) and said shoulder jaw (**51**) each have a perimeter portion (**30**) said perimeter portions (**30**) lying in a common plane thereby allowing said cradle (**23**) and said shoulder (**25**) to abut either the header or the footer (**26**).

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**5,490,335**

**INSIDE AND OUTSIDE DIAMETER MEASURING GAUGE**

**George H. Chu, 111 156th Ave. NE., Bellevue, Wash. 98007**

**Filed Jul. 21, 1994, Ser. No. 278,249**

**Int. Cl.[6] G01B** *5/08*

**U.S. Cl. 33—810** **12 Claims**

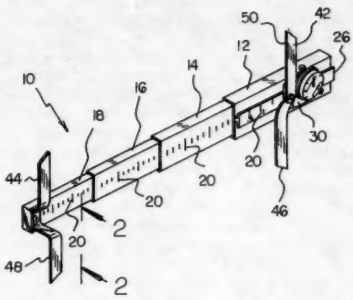
1. An inside and outside diameter instrument comprising:

a main body having measuring indicia placed thereon;

a slider movably coupled to said main body;

a gauge mounted to said slider for indicating a position of said slider relative to said main body;

first and second outer diameter legs, hereafter designated as OD legs, with said first OD leg being pivotally mounted to said slider and said second OD leg being coupled with said main body and pivotal relative to said main body, said first and second OD legs including inwardly facing interior surfaces




which cooperate to facilitate measurement of an exterior surface of an object; and,

first and second inner diameter legs, hereafter designated as ID legs, with said first ID leg being pivotally mounted to said slider and said second ID leg being coupled with said main body and pivotal relative to said main body, said first and second ID legs including oppositely facing exterior surfaces which cooperate to facilitate measurement of an inside of said object.

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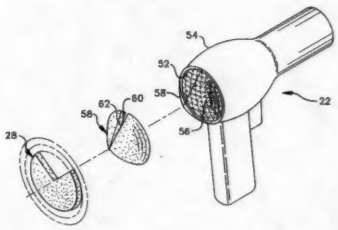
**5,490,336**

**AIR INTAKE FILTER FOR ELECTRIC APPLIANCES**

**Gary L. Smick, 20030 88th Ave., W., Edmonds, Wash. 98026; Michael L. Kjer, 10802 NE. Sherwood Dr., Vancouver, Wash. 98686, and Michael B. Koler, 6028 38th NE., Seattle, Wash. 98115**

**Filed Jan. 10, 1994, Ser. No. 179,445**
**Int. Cl.[6] F26B** *21/06*
**U.S. Cl. 34—97** **7 Claims**




1. An electric motor-powered appliance which comprises:

a housing;

an air intake in said housing:

a screen in said air intake; and

a replaceable filter means for keeping particulate material from reaching the interior of the housing through the air intake;

said filter means being fabricated from a sheetlike blank of foam material having means for trapping gross and minute particles of solids and liquids while offering minimized resistance to the passage of air therethrough;

there being an adhesive on one side of said filter; and

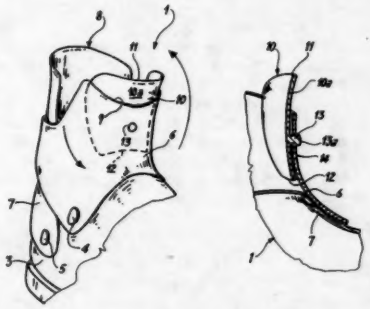
said filter means being fixed over said air intake on the external side of said housing by said adhesive and with the filter means trapped against and supported by said screen.

**5,490,337**

**ARTICLE OF SPORT FOOTWEAR, IN PARTICULAR A SKI BOOT**

**Gianfranco Zerbinati, Montebelluna, Italy, assignor to Dolomite S.p.A., Montebelluna, Italy**

**Continuation of Ser. No. 131,905, Oct. 5, 1993, abandoned. This application Jan. 3, 1995, Ser. No. 368,257**
**Claims priority, application Italy, May 7, 1993, PD93A0107**
**Int. Cl.[6] A43B** *5/04*
**U.S. Cl. 36—119** **14 Claims**



1. An article of sport footwear including a boot cell which incorporates a bootleg portion encircling a boot entrance having a size sufficient to receive a leg therethrough, characterized in that said footwear includes a plate-like lug including first and second lug portions and a pivot pin, said lug located at the entrance of said boot shell and effective to provide predetermined support conditions for the leg, said lug being attached so as to be rotatably pivotable relative to the boot shell while the lug remains attached to the shell by the pivot pin and rotates into at least first and second working positions, so that when in said first working position, said lug presents said first lug position to said entrance and when pivoted into said second position, said lug presents said second lug portion to said entrance, such that the support conditions afforded for the leg can be changed by rotating said lug between said first and second positions.

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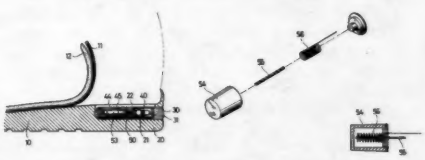
**5,490,338**

**FIXING STRUCTURE FOR LIGHTENING CIRCUIT ON LIGHTENING SHOE**

**Wen I. Hwang, 5F-9, No. 5, Wu Chuan 1 Rd., Hsin Chuang City, Taipei Hsien, and Ming C. Tsu, No. 18, Sec. 3, Cherng Der Rd., Taipei, both of, Taiwan, Prov. of China**

**Filed Oct. 31, 1994, Ser. No. 331,427**
**Int. Cl.[6] A43B** *23/00;* **F21L** *15/08*
**U.S. Cl. 36—137** **2 Claims**



1. A fixing structure for the lightening circuit on a lightening shoe, comprising

on a shoe heel of said lightening shoe a receiving recess;

a soft transparent fixing seat capable of inserting in and matching with said receiving recess by size;

a box groove on the top of said fixing seat being aligned with a slot provided on the top of said receiving recess and extending through to the bottom face of an insole in said lightening shoe;

a transparent protecting box received by and matching by size with said box groove of said fixing seat;

a lightening electric circuit being received in said transparent protecting box;

a battery receptacle being provided on the top of said protecting box and being allowable of access to two battery contacting parts on a circuit board for said lightening electric circuit;

two vertical guiding grooves being provided on the wall of said battery receptacle;

two horizontal engaging grooves each being located clockwise aside one of said guiding grooves;

a receptacle cover having a groove thereon being able of covering said battery receptacle;

two "L" shaped engaging pieces corresponding by position to said two guiding grooves and being provided on the bottom of said receptacle cover;

a battery being inserted between and engaged by said engaging pieces, said engaging pieces being able of inserting in said vertical guiding grooves, and rotation of said receptacle cover rendering said engaging pieces to engage said horizontal engaging grooves and thereby covering said battery receptacle of said protecting box.

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**5,490,339**

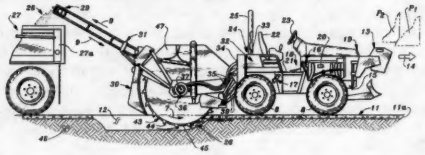
**TRENCHING SYSTEM FOR EARTH SURFACE USE, AS ON PAVED STREETS, ROADS, HIGHWAYS AND THE LIKE**

**Frank J. Accettola, 9006 Steele Rd., Napa, Calif. 94558**

**Filed Jun. 2, 1994, Ser. No. 252,768**

**Int. Cl.[6] E02F** *5/08*

**U.S. Cl. 37—94** **23 Claims**



**1**. A center-line trenching system for use at the earth's surface comprising

a drive machine of transverse width **W1** movable over the earth's surface including a rear mounting surface, a power drive train system and an fuel driven engine, a series of hydrostatic pumps operatively connected to said fuel driven engine, and control unit for controlling at least one of said series of hydrostatic pumps,

a center-line earth saw attached to said rear mounting surface and operatively attached to at least one of said hydrostatic pumps, said earth saw extending from said machine and including a cutting disc having cutting protuberances circumferentially spaced about its periphery and said center-line saw being adjustable relative to said rear mounting surface for varying the cutting depth relative to said earth's surface along a first working plane normal to the said earth's surface passing through said drive machine, a shroud extending over a sector of said cutting disc fixedly mounted relative to the cutting disc and including an opening to one side of said first working plane, said shroud also including a lower segment positioned to collect debris cut from said earth formation, and convey said debris toward and from said side opening to exterior of said earth saw,

a conveyer also attached to said rear mounting surface of said drive machine side-by-side relative to said earth saw to define overall transverse width **W2** therewith, said conveyer defining a bisecting working plane parallel to said first working plane also passing through said drive machine and being operatively attached to at least one of said hydrostatic pumps through said control unit,

said conveyer including a subframe pivotally attached relative to said rear mounting surface of said drive machine, an elongated main frame pivotally mounted to said subframe at a near end region in a upwardly ramped position relative to said near end region of said main frame, and including a trailing end region remote therefrom, a hydrostatic actuator pivotally mounted between said subframe and said main frame, and on-site wheel subassembly pivotally attached to said subframe and having a pair of swivel wheels in rolling contact with said earth's surface during an active state of said conveyor,

said main frame including a pair of rubber tired wheels for trailering said conveyer to a job site but positionable above said earth's surface during said active state of said conveyor,

said hydrostatic actuator being operatively attached to said at least one hydrostatic pump through said control unit to perform two functions: (i) to provide a linear force to said main frame to permit said main frame to be tilted about said near pivoting end region thereof to provide said upwardly sloped position whereby said rubber tired wheels are elevated off said earth's surface and permit relocation of said swivel wheels of said on-site wheel subassembly to provide rolling contact with said earth's surface and (ii) to relocate said trailing end region of main frame to provide a working sloped position of said main frame whereby said trailing end region of said main frame is positioned at a pre-selected height relative to said earth's surface to permit debris to be offloaded,

a rubber tired, self propelled vehicle downstream of said conveyor to collect said debris exiting therefrom, said vehicle having a transverse width **W2** and including a truck bed positioned relative to said trailing end region of said main frame to catch by gravity said debris exiting therefrom.

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**5,490,340**

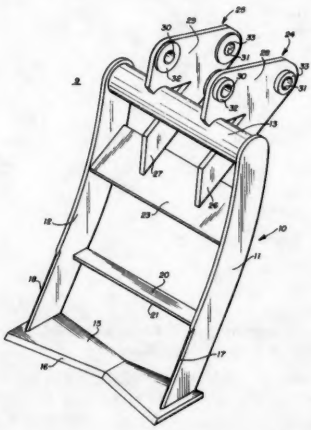
**ROOT GRUBBER**

**Robert G. Muncy, 4400 W. 10th, Odessa, Tex. 79763**

**Filed Aug. 31, 1994, Ser. No. 299,197**

**Int. Cl.[6] A01B** *13/00*

**U.S. Cl. 37—301** **8 Claims**



**1**. A root grubber tool for attachment to the boom of an excavator or similar earth working machine comprising:

a spaced apart pair of arcuate side members, each having an upper end, a lower end and a leading edge at the lower end;

a cutting blade with a leading edge mounted beneath the lower ends of said pair of arcuate side members extending outboard of said pair of arcuate side members, said cutting blade extending beyond the leading edges of said pair of arcuate side members and forming an obtuse angle therewith, and said

cutting blade swept centrally inward relative to the leading edges of said pair of arcuate side members to form an obtuse angle along the leading edge of said cutting blade and swept centrally downward to form an obtuse angle with each of said pair of arcuate side members;

a mounting section for attachment of the tool to the boom of the excavator secured between the upper ends of said pair of arcuate side members;

a support plate extending between said pair of arcuate side members intermediate said mounting section and said cutting blade;

a pair of mounting brackets secured to said mounting section and said support plate, said mounting brackets arranged to allow coupling of the root grubber tool to the excavator for arcuate movement of the tool relative to the boom and excavator.

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**5,490,341**

**Patent Not Issued For This Number**

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**5,490,342**

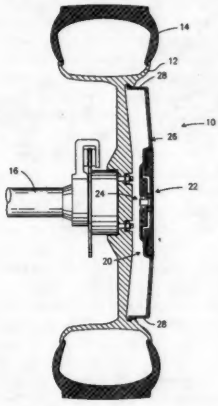
**NON-ROTATING WHEEL COVER**

**Michael J. Rutterman, 371 Redland Bay Rd., Capalaba, Queensland, Australia, and Leslie Hsiao, 120 Barrington Dr., Brandon, Fla. 33619**

**Filed Jul. 13, 1994, Ser. No. 275,017**

**Int. Cl.[6] G09F** *21/04*

**U.S. Cl. 40—587** **7 Claims**




1. A wheel cover for mounting on a wheel rim rotationally coupled to a vehicle, said wheel cover comprising a base member having a disc member rotatably mounted thereto to display an indicia thereon, said base member including a base stabilizing means and said disc member includes disc stabilizing means configured to mate with each other to maintain concentric alignment and restrict oscillation of said disc member relative to said base member and a counterweight attached to said disc member such that as said base member rotates with the wheel rim said disc member does not rotate relative to the vehicle so that the indicia on said disc member can be viewed as the vehicle translates over a supporting surface, said base member comprises an inner base element configured to operatively support said disc member thereon and said disc member comprises a disc element, said base stabilizing means comprising a base hub formed on said inner base element and said disc stabilizing means comprising a hub alignment recess formed in said disc element disposed to receive at least a portion of said base hub therein, said disc stabilizing means further includes a disc hub formed on said disc element and said base stabilizing means further includes an annular limit rim extending outwardly from said base hub disposed to receive at least a portion of said disc hub therein, said disc stabilizing means further includes a disc tongue extending outwardly from said disc element and said base stabilizing means further includes a base groove formed on said inner bass element to receive at least a portion of said disc tongue therein and said base stabilizing means further includes a base tongue extending outwardly from said base member and said disc stabilizing means further includes a disc groove formed on said disc element to receive at least a portion of said base tongue therein, said base member further includes an outer base element comprising an annular plate extending from an outer periphery of said inner base element, said disc stabilizing means further includes a disc ridge extending outwardly from said disc element and said base stabilizing means further includes a base channel formed on said annular plate and disposed to receive at least a portion of said disc ridge therein.

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**5,490,343**

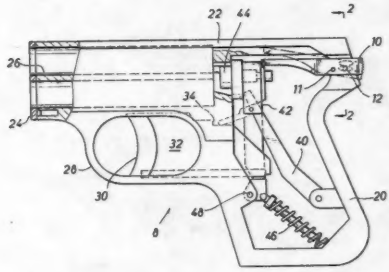
**SAFETY DEVICE FOR DEFENSIVE WEAPON AND SPECIAL CARTRIDGE**

**Thornton E. Cory, P.O. Box 9790, Houston, Tex. 77213, and John N. Gold, Jr., P.O. Box 690265, Houston, Tex. 77070**

**Filed Sep. 15, 1994, Ser. No. 306,644**

**Int. Cl.[6] F41A** *17/26*

**U.S. Cl. 42—70.08** **11 Claims**




1. A safety for a defensive weapon having a cased cartridge mounted therein wherein the defensive weapon includes:

(a) a barrel above a handle;

(b) a cartridge receiving chamber within said barrel;

(c) a movable trigger connected with a hammer on the interior of the handle;

(d) a firing pin operated by the hammer to strike said cartridge in said barrel to fire said cartridge;

(e) said safety including

(1) an elongated lever having a hand operated end and also a locking end;

(2) a pivot supporting said lever to permit movement of said lever between a safe position and a firing position; and

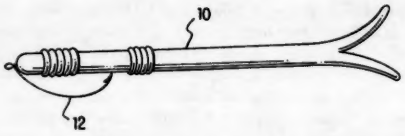
(3) means for locking said safety in the safe position or firing position; wherein said locking means comprises two shoulder defined dimples on said lever and a releasable lock member engages one of said dimples at a shoulder thereof.

**5,490,344**

## GLOW-IN-THE-DARK MATERIAL FOR FISHING ACCESSORIES

**Robert A. Bussiere, 1405 Whisperwood Dr., Columbus, Ga. 31907**

**Filed Mar. 22, 1994, Ser. No. 216,228**
**Int. Cl.[6] A01K** *75/02;85/01;* **C09K** *11/00*
**U.S. Cl. 43—17.5** **12 Claims**




1. An improved glow-in-the-dark composition suitable for molding of fishing accessories, said composition comprising:

about 0.1%–2% by volume white powder, wherein the white powder is selected from a group consisting of baking soda and salt; and

about 0.5%–9% by volume phosphorescent substance, wherein the balance of the composition comprises a plastic resin, and wherein said white powder provides a background to enhance the brightness of said phosphorescent substance.

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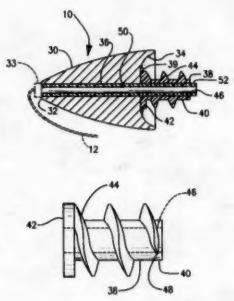
**5,490,345**

## SINKER APPARATUS FOR TEXAS RIG FISHING LURE

**Charles E. Infinger, 629 E. Obispo Ave., Clewiston, Fla. 33440**

**Filed May 2, 1994, Ser. No. 235,867**
**Int. Cl.[6] A01K** *91/02;91/04*
**U.S. Cl. 43—42.39** **8 Claims**







1. A fishing sinker apparatus for a Texas rig-type fishing lure, wherein an eyelet portion of a hook at the end of a fishing line is embedded proximate a head of the lure and a pointed portion of the hook is embedded proximate a tail of the lure, said apparatus comprising:

a convexly tapered weight member having a narrow leading portion, a broad trailing portion and an axial opening that extends through said weight from said leading portion to said trailing portion;

a screw element attached to said trailing portion of said weight member and including a central shaft portion that extends axially from said trailing portion and an elongate thread wound about said shaft portion and interengaging said shaft portion for a majority of the length of said thread; and

means defining an elongate conduit that extends axially through said central shaft and into said axial opening of said weight member for slidably receiving said fishing line and anchoring said screw element to said weight member, said screw element having a length and diameter that permit said screw member and said weight member to release from said lure when said eyelet of said hook is pulled against said screw such that said sinker is slidable along said fishing line.

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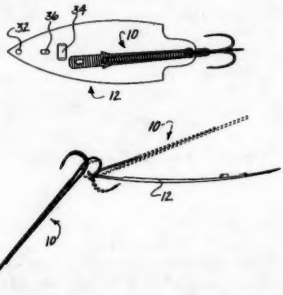
**5,490,346**

## FISHHOOK DEVICES AND ASSEMBLAGES OF PARTS THEREFOR

**John R. Guest, 34 Forest Street, Aylmer, Quebec, Canada, assignor to John Robert Guest, and Brian Bradfield**

**Filed Jul. 8, 1994, Ser. No. 271,937**
**Int. Cl.[6] A01K** *85/02*
**U.S. Cl. 43—42.4** **21 Claims**




16. A fishhook assemblage comprising a hook unit and a plurality of lure members each releasably attachable individually, to the hook unit, the hook unit comprising a first arm and a second arm joined together by a joint, one of the first arm and second arm being resiliently pivotable about the joint between a first position in which the first arm extends at an acute angle to the second arm and a second position in which the arms are together, the first arm having first and second hooks at a distal end thereof and the second arm having a third hook at a distal end thereof, the hooks each comprising a point and a curved portion, the curved portions of the first and second hooks diverging to respective sides of a longitudinal axis of the hook unit and curving towards the first arm, the third hook curving towards the first arm in a plane through the longitudinal axis, each of the plurality of lure members having a loop and a first releasable fastener part spaced apart longitudinally, the loop towards a trailing end of the lure member and the releasable fastener part towards a leading end of the lure member, the hook unit having a second releasable fastener part adjacent the joint, whereby the hook unit and one of the lure members can be attached together by extension of the second arm through the loop and by cooperation of the first and second releasable fastener parts, such that, with the hook unit and lure member assembled and the arms in the first position, the point of the third hook is shielded by the first and second hooks and the points of the first and second hooks are shielded by the lure member and, with the arms in the second position, the point of the third hook projects clear of one side of the lure member and the points of the first and second hooks project clear of the opposite side of the lure member.

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**5,490,347**

## FISHING LURE

**Steven P. Conley, 60 Thetford Ave., Braintree, Mass. 02184**

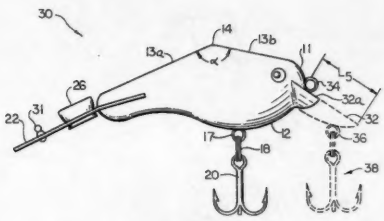
**Filed Jan. 12, 1994, Ser. No. 180,854**
**Int. Cl.[6] A01K** *85/00*
**U.S. Cl. 43—42.47** **14 Claims**

1. A fishing lure comprising:

a lure body having a first end and a second end and having a surface with first and second planar portions which intersect at predetermined on the surface;

a tail coupled to the second end of said lure body;

a pair of weights coupled to said tail, each of said weights having at least a first portion thereof eposed to a first side of




said tail and each of said weights having at least a second portion thereof exposed to a second side of said tail; and

a front lip coupled to the first end of said lure body wherein the shape of said front lip is substantially round and the shape of said tail is substantially rectangular,

wherein when said lure follows a substantially vertical descent path through the water said lure descends along the substantially vertical path with a repetitive side to side motion.

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**5,490,348**

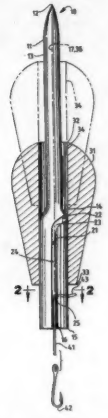
**TWO PIECE SLIP BOBBER**

**Henry S. Serba, 4343 N. Clarendon St. 1512, Chicago, Ill. 60613**

**Filed Jan. 31, 1995, Ser. No. 380,943**

**Int. Cl.[6] A01K** *93/00*

**U.S. Cl. 43—44.93** **4 Claims**



**1**. A self-uprighting bobber comprising:

a float, the float having a float keel end, having a float visible end, and having a float bore through the float from the float visible end to the float keel end, the float bore having a float bore cross section which is centered in the float to render a combined float and float bore center line along which all net vertical forces act when the bobber is used for angling;

a stem, the stem having a stem in-water end, a stem upper end, and a stem body, the stem body having a stem cross section just less than the float bore cross section and having a stem center line, so that the stem can be removably disposed into the float bore with the stem in-water end below the float keel end and with the stem center line coinciding with the float center line so that when the bobber is used for angling all net vertical forces act along the coincident stem centerline and float and float bore center line;

a stem slot fully through the stem body, the stem slot having a stem slot bottom in the stem body above the stem in-water end, the stem slot having a stem slot vertical section extending from the stem slot bottom in the stem body along the stem center line toward the stem upper end, the stem slot further having a stem slot entry section which connects the stem slot vertical section with a stem slot mouth which breaches the stem body, so that a fishing line can be placed through the stem slot mouth, through the stem slot entry section, down the stem slot vertical section to the stem slot bottom;

a stem channel, the stem channel extending radially into the stem body to just beyond the stem center line, the stem channel also extending from the stem slot bottom to the stem in-water end, so that a fishing line hook end will hang in the stem channel along the stem center line and thus also hang along the float and float bore center line so that when the bobber is used for angling all net vertical forces act along the coincident stem center line and float and float bore center line; and

a stem bulge in the stem body, the stem bulge making the stem cross section just greater than the float bore cross section, so that the stem bulge can be removably wedged into the float bore with the stem slot mouth inside the float bore and with the stem slot bottom below the float keel end so that the fishing line is held loosely in the stem slot and can freely slip through the stem slot.

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**5,490,349**

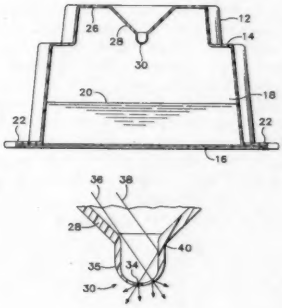
**INSECT TRAP WITH LIQUID ATTRACTANT**

**Scott Muramatsu, 13311 SE. Beech, Milwaukie, Oreg. 97222**

**Filed Sep. 27, 1993, Ser. No. 127,314**

**Int. Cl.[6] A01M** *1/02*

**U.S. Cl. 43—122** **5 Claims**




**1**. An insect trap, comprising:

(a) a substantially opaque enclosure defining a chamber;

(b) wherein a portion of said enclosure forms an inlet having a wall and defining an opening into said chamber wherein said wall is substantially translucent proximate said opening and substantially opaque where not proximate said opening;

(c) said inlet being funnel-shaped depending from said enclosure and having a tapered wall thickness that is least thick proximate said opening, said tapered wall thickness creating a gradient translucency.

**5,490,350**

## TREE STAND

**Johann Eisenschenk, Stamsried, and Klaus Krinner, Strasskirchen, both of, Germany, assignors to Krinner GmbH, Strasskirchen, Germany**

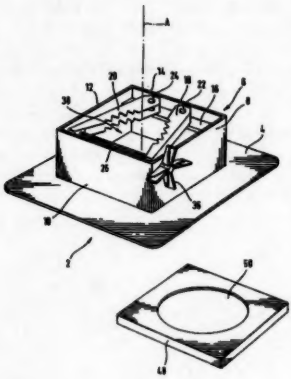
**PCT No. PCT/DE92/00319, § 371 Date Feb. 10, 1994, § 102(e) Date Feb. 10, 1994, PCT Pub. No. WO92/18038, PCT Pub. Date Oct. 29, 1992**

**PCT Filed Apr. 15, 1992, Ser. No. 137,148**

**Claims priority, application Germany, Apr. 15, 1991, 9104560 U**

**Int. Cl.[6] A47G** *7/02*

**U.S. Cl. 47—40.5** **11 Claims**



1. Tree stand comprising:

a housing having a vertical axis;

a receiving opening positioned in said housing which is traversed by said vertical axis and in which a tree trunk may be vertically received such that said tree trunk is disposed within said housing substantially parallel to said vertical axis;

at least two substantially horizontally arranged clamping bars defining said receiving opening, said clamping bars including a free end and a supported end and being supported at said supported ends so as to allow said clamping bars to swivel in a substantially horizontal plane at said supported ends, said receiving opening being adjustable by said clamping bars whereby said clamping bars may be engaged with said tree trunk, wherein each of said free ends of said clamping bars includes a threaded region; and

a central clamping device including two inversely threaded sections which engage said threaded regions of said free ends of said clamping bars, said central clamping device comprising a threaded rod which is rotatable with respect to said housing, wherein said clamping bars are adapted to move simultaneously and substantially symmetrically with respect to said vertical axis responsive to rotation of said threaded rod.

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**5,490,351**

## LOW COST SOD MAT AND METHOD FOR PROPAGATION

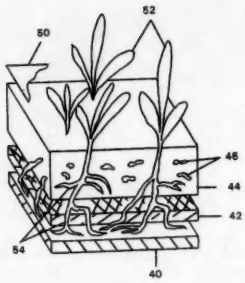
**Charles J. Molnar, and Judith R. Molnar, both of 12 Malvern Ct., Wilmington, Del. 19810, assignors to Charles J. Molnar, and Judith R. Molnar, both of Wilmington, Del.**

**Continuation of Ser. No. 34,231, Mar. 22, 1993, Pat. No. 5,345,713, which is a continuation-in-part of Ser. No. 745,224, Aug. 14, 1991, abandoned. This application Sep. 12, 1994, Ser. No. 304,699**

**Int. Cl.[6] A01C** *1/04*

**U.S. Cl. 47—56** **23 Claims**

1. A plant sod mat comprising the following:




a) a sod reinforcement wherein said sod reinforcement comprises a pattern bonded, polyolefin nonwoven fabric having nonbonded fiber regions and bonded fiber regions;

b) a layer of planting medium on said sod reinforcement; and

c) viable plants growing in said planting medium and whose roots penetrate and entangle with said sod reinforcement.

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**5,490,352**

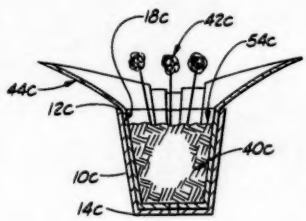
## METHOD FOR GROWING BOTANICAL ITEMS AND PROVIDING A DECORATIVE COVER FOR SAME

**Donald E. Weder, Highland, and William F. Straeter, Breese, both of Ill., assignors to Highland Supply Corporation, Highland, Ill.**

**Continuation of Ser. No. 922,302, Jul. 30, 1992. This application Apr. 18, 1994, Ser. No. 228,999**

**Int. Cl.[6] A01B** *79/00*

**U.S. Cl. 47—58** **6 Claims**




1. A method for growing a botanical item, comprising the steps of:

providing a container having an upper end with an opening formed through the upper end providing access to a container retaining space and a lower end;

providing a decorative covering with an upper end and a lower end and a base extending between the upper end and lower end and with an opening formed through the upper end thereof providing access to a covering receiving space within the base and wherein the decorative covering comprises a plurality of connected overlapping folds in the base for holding the shape thereof;

placing the decorative covering in the container retaining space and positioning the decorative covering in the container retaining space such that the opening in the upper end of the decorative covering is disposed near the opening in the upper end of the container and such that the decorative covering is freely disposed within the container when positioned within the container retaining space;

disposing growing medium in the covering receiving space of the decorative covering;

growing the botanical item in the growing medium in the decorative covering to a desired extent; and

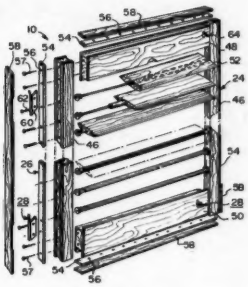
removing the decorative covering with the growing medium and the botanical item disposed therein from the container.

**5,490,353**

## ELEGANT PLANTATION SECURITY SHUTTER ASSEMBLY

**Robert McLaughlin, 2040 Eastridge Ave.; Ste. B-4, Riverside, Calif. 92507**

**Filed Oct. 14, 1994, Ser. No. 324,515**
**Int. Cl.[6] E06B** *7/08*
**U.S. Cl. 49—64** **9 Claims**



1. An elegant plantation security shutter assembly for a window in a wall of a building comprising:

a) a casing, said casing including a pair of wooden side jambs, each having a central channel slot and a pair of spaced apart mortise holes, a wooden top jamb, having a central channel slot and a pair of spaced apart mortise holes, and a wooden bottom jamb, having a central channel slot and a pair of spaced apart mortise holes;

b) means for reinforcing said casing, said casing reinforcing means including four flat steel bars, each to fit into the respective central channel slots in said side jambs, said top jamb and said bottom jamb;

c) means for mounting said casing onto the wall behind the window;

d) a pair of shutters;

e) means for reinforcing each said shutter; and

f) means for securing each said shutter within said casing, so as to stop a thief from an unauthorized entry through the window into the building, by preventing the thief from breaking said shutters and said casing.

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**5,490,354**

## CABLE MECHANISM FOR RAISING AND LOWERING WINDOWS OF MOTOR VEHICLES

**Uwe Klippert, Oberaula, Germany, assignor to Brose Fahrzeugteile GmbH & Co. Kommanditgesellschaft, Coburg, Germany**

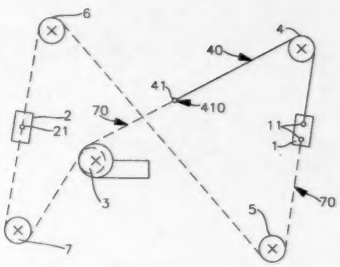
**Continuation-in-part of Ser. No. 945,518, Sep. 16, 1992, Pat. No. 5,359,811. This application Jun. 15, 1994, Ser. No. 260,187**
**Claims priority, application Germany, Sep. 16, 1991, 41 31 100.0**
**Int. Cl.[6] E05F** *11/48*
**U.S. Cl. 49—352** **6 Claims**

1. A device for raising and lowering a window pane of a window of a motor vehicle, the window pane having a maximum raised position to fully close the window pane and a maximum lowered position to fully open the window pane, said maximum raised position and said maximum lowered position defining a first distance therebetween, and said device comprising:

first and second carrier means attached to the window pane and spaced apart from one another, said first and second carrier means being configured for movement along with, and parallel to one another;

a cable attached to said first and second carrier means for moving said first and second carrier means to move the window pane over at least a portion of the first distance;

drive means for moving the cable along a path of travel;



first and second cable guide means for guiding movement of said cable along the path of travel during raising and lowering of the window pane, said first and second carrier means being movable towards said first and second guide means during raising of the window pane, and said first and second carrier means being movable away from said first and second guide means during lowering of the window pane;

third and fourth guide means disposed opposite to said first and second guide means for movement of said carrier means along the path of travel towards said third and fourth guide means during lowering of the window pane; said cable forming a closed cross-over loop extending from said first carrier means over said first and third guide means to said second carrier means and from said second carrier means over said second and fourth guide means back to said first carrier means;

said first carrier means being disposed between said fourth and first guide means along the path of travel and said second carrier means being disposed between said third and second guide means along the path of travel; said first guide means being disposed between said first carrier means and said drive means along said path of travel;

said third guide means being disposed between said drive means and said second carrier means along said path of travel;

said cable having at least a first segment and a second segment, said first segment passing over said first guide means during raising and lowering of the window pane;

said first segment bearing a load of the window pane during at least the raising of the window pane and said second segment bearing a load of the window pane during at least the lowering of the window pane;

said load during raising the window pane being greater than said load during lowering the window pane;

said first segment having a first load rating and said second segment having a second load rating;

said first load rating being greater than said second load rating; and

said second cable segment passing over at least said second and fourth guide means during raising and lowering of the window pane.

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**5,490,355**

## WASTE COLLECTION DEVICE

**Giancarlo Galeazzi, and Angelo Fusaro, both of Via Roma, 78, 46049 Volta Mantovana (Prov. of Mantova), Italy**

**Filed May 2, 1994, Ser. No. 236,806**
**Claims priority, application Italy, May 7, 1993, MN93A0009**
**Int. Cl.[6] E02D** *27/00*
**U.S. Cl. 52—29** **10 Claims**

1. In combination:

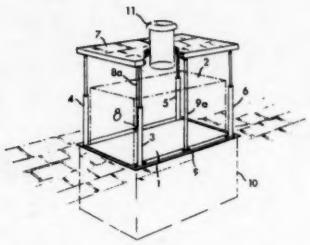
a pit;

paving surrounding said pit;

lifting means located in said pit;

a base connected to said lifting means;

a container resting on said base, said lifting means being operable for moving said base and said container between a lowered position, whereat said base lies proximate to the



bottom of the pit, and a raised position whereat said base is flush with said paving surrounding said pit;

a lid overlying said container;

a hollow column connected to said lid for introducing waste into said container to form a pile of waste within said container, and;

empty spaces defined upwardly within said container between said pile of waste and said lid;

wherein said hollow column defines a volume, and wherein said volume of said hollow column is equal to a volume of at least one of said empty spaces.

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**5,490,356**

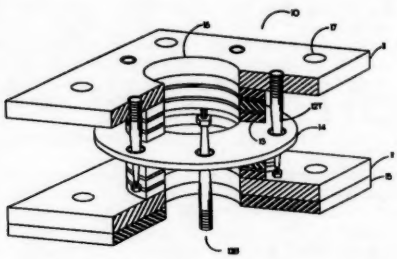
**SEISMIC ISOLATION BEARING**

**Zoltan A. Kemeny, Tempe, Ariz., assignor to MM Systems of Arizona, Phoenix, Ariz.**

**Filed Nov. 24, 1993, Ser. No. 156,550**

**Int. Cl.[6] E04B** *1/98*

**U.S. Cl. 52—167.7** **20 Claims**



1. An isolation bearing assembly, comprising:

an upper load plate having a first downwardly facing surface;

an oppositely disposed lower load plate having a second upwardly facing surface;

a reinforced rubber bearing body extending between and contacting said first and second surfaces;

a mid plate disposed approximately midway between and substantially parallel to said first and second surfaces and having a distal portion which extends radially beyond said body, said distal portion including a plurality of holes formed therein;

at least one first yield pin extending substantially orthogonally from said first surface, through a first one of said holes, and having a first distal end terminating between said first hole and said second surface;

at least one second yield pin extending substantially orthogonally from said second surface, through a second one of said holes, and having a second distal end terminating between said second hole and said first surface;

wherein, in response to an externally applied lateral force, said body is configured to resiliently deflect such that said first and second pins are engaged by said distal portion of said mid plate to thereby plastically deform said pins.

**5,490,357**

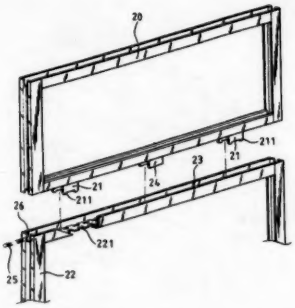
**STRUCTURE ROOM DIVIDER HEIGHT EXTENSION**

**Ching-Hua Lin, Taipei, Taiwan, Prov. of China, assignor to UB Office Systems Incorporation, Taipei, Taiwan, Prov. of China**

**Filed Jun. 30, 1994, Ser. No. 269,805**

**Int. Cl.[6] E04B** *2/74*

**U.S. Cl. 52—220.7** **1 Claim**



1. A room divider height extension that includes:

An original room divider structurally consisting of an oblong partition that has a U-shaped slot along the upper edge and on two sides of the aforesaid slot are openings for the insertion of electric power lines, furthermore, there are square holes arrayed at equal intervals on the lower portion of the aforementioned slot;

A room divider height extension structurally consisting of an oblong panel that has three inverted-U shaped support tabs welded to the bottom edge and the two sides of the aforesaid support tabs are slanted inwards at a slight angle; furthermore, the width of the aforesaid support tabs is identical to the inner lateral width of the aforementioned U-shaped slot on the aforementioned original room divider to facilitate the insertion of the aforesaid support tabs into the aforesaid U-shaped slot;

the inverted-U shaped support tabs of the aforementioned room divider height extension, further comprising four semicircular tabs protruding from the left and the right lower edges of the aforesaid support tabs, wherein the aforesaid four semicircular tabs are utilized for insertion into the aforementioned square holes arrayed at equal intervals on the lower portion of the aforementioned U-shaped slot along the upper edge of the aforementioned original room divider and to tightly assemble the aforesaid room divider extension to the aforesaid original room divider, while the insertion together of the aforesaid support tabs and the aforesaid U-shape slot forms a line/cable tunnel that accommodates the hidden installation of electric power lines as well as facilitates simple height adjustment during the installation process.

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**5,490,358**

**RETAINER AND WEATHERSEAL FOR STRUCTURALLY BONDED GLAZING**

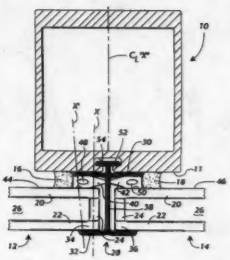
**Fred A. Grunewald, Roswell, Ga.; Dean C. DeBoy, Visalia, Calif., and Wayne E. Whitmyer, Lilburn, Ga., assignors to Kawneer Company, Norcross, Ga.**

**Continuation of Ser. No. 653,983, Feb. 11, 1991, Pat. No. 5,245,808, which is a continuation of Ser. No. 444,666, Dec. 1, 1989, abandoned. This application Sep. 20, 1993, Ser. No. 123,738**

**Int. Cl.[6] E04H** *1/00*

**U.S. Cl. 52—235** **5 Claims**

1. A method for installing an elongate retainer member for use in conjunction with an elongated frame member for accepting a marginal edge of a glass panel and for retaining said marginal edge



relative to said frame member, said frame member defining a front surface portion and defining a securing channel ,said method comprising the steps of;

A) attaching an elongate retainer member to said frame member, said elongate retainer member itself comprising:

1) a spine;

2) a transverse base flange;

3) a securing head formed at a rearward edge of said spine; and

4) a foot member formed at the forward edge of said spine, said spine and said foot member at least partially defining a retaining channel,

said elongate retainer member and said frame member being attached such that said securing head is slidably received within said securing channel of said frame member so that a portion of said securing head faces said inwardly facing wall portion of said securing channel;

B) positioning said glass panel relative to said retainer member and said frame member such that said marginal edge of said glass panel is received within said retaining channel such that said front surface portion, said marginal edge of said glass panel, said base flange, and said foot member all intersect a first axis; and

C) installing a resilient spacer portion also intersecting said first axis for biasing said foot member outward so as to encourage frictional engagement between said portion of said securing head and said inwardly facing wall of said securing channel, said spacer portion positioned such that said base flange is positioned between said spacer portion and said front surface of said frame member.

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**5,490,359**

## APPARATUS AND METHOD FOR ATTACHING PLASTIC SIDING OR TRIM PIECES TO METAL SHEATHING

**Jacque Hepler, R.D. 2, Box 87, Hegins, Pa. 17938**

**Filed Jul. 8, 1994, Ser. No. 272,053**

**Int. Cl.[6] E04D** *1/34*

**U.S. Cl. 52—506.06** **1 Claim**

1. In combination, a metal sheathing of a building, a plastic covering sheet, and means for properly attaching said plastic sheet to said metal sheathing, the attaching means comprising a metal clip having a top portion folded over the top of said plastic sheet and having a laterally punched out portion extending through said plastic sheet, and a weld pin having one end extending through said punched out portion of said metal clip, to contact the metal sheathing.

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**5,490,360**

## ROOFING ELEMENTS

**John A. Fifield, Aylesbury, Great Britain, and Paul V. Childress, Warrenton, Va., assignors to Oldcastle Inc., Los Angeles, Calif.**

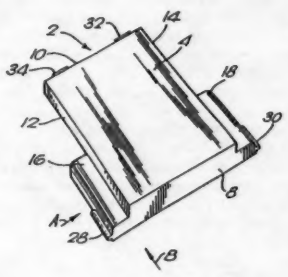
**Continuation of Ser. No. 70,150, May 28, 1993, abandoned.**

**This application Dec. 9, 1994, Ser. No. 352,980**

**Claims priority, application United Kingdom, May 29, 1992, 9211351**

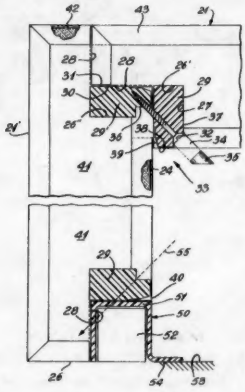
**Int. Cl.[6] E04D** *1/00*

**U.S. Cl. 52—533** **9 Claims**



1. A roofing element comprising an upper surface and at least two pairs of oppositely facing side edges of which at least one pair of side edges is provided with co-operating members, each of which is adapted to cooperate with at least two further such roofing elements of which each is disposed adjacent one of said opposite side edges of said one pair, said co-operating members and each of said roofing elements being adapted to be so disposed in relation to one another that movement of one of said roofing elements would necessarily involve movement of at least two of said oppositely adjacent roofing elements, and at least one spacer member extending laterally from at least one of said side edges adapted for spacing said roofing element from an adjacent roofing element, said at least one spacer member being adapted to create an air-flow passage which is adapted to communicate between co-operating roofing elements and which is adapted to space edges of said upper surfaces from adjacent roofing elements along said at least one side edge from which said at least one spacer member extends.

**5,490,361**
**MODULAR PANEL FOR RIGHT ANGLE INTERCONNECTION**
**Jean-Pierre Gingras, 1693 Marie-Dubois, Carignan, Quebec, Canada**
**Filed Dec. 27, 1993, Ser. No. 172,949**
**Int. Cl.[6] E04C *3/00***
**U.S. Cl. 52—578** **7 Claims**



1. A modular panel assembly of interconnectable rectangular modular panels, each said modular panels having opposed parallel outer and inner surfaces, side edges and end edges; said end edges each having a longitudinal right-angle connecting recess therealong and extending from across said side edges and having an opening in said inner surface, said longitudinal right-angle connecting recess defining a transverse end wall and a lateral planar flat wall, an elongated connector member secured along said connecting recess and disposed in contact with said transverse end wall, said connector member having a fastener receiving inner corner recess therealong, said lateral planar flat wall defining an abutment end wall having a dimension which is the same as the width of the outer surface of said elongated connector member, said connector member being constructed from material capable of receiving fasteners therein, said connecting member having at least a portion thereof disposed alongside an end portion of said inner surface of said panel whereby when two of said panels have their panel connecting recesses mated with one another one or more fasteners may be introduced through one of said connector members from a side of said inner surface of one of said panels to secure said connector members together to secure said two of said panels, and further connecting means along said side edges of said panel.

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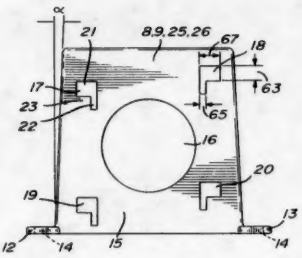
**5,490,362**
**HOLLOW BLOCK SYSTEM**
**Camille Mercier, C.H.L.G.R., Radisson, Baie-James, Québec, Canada**
**Filed Aug. 26, 1994, Ser. No. 296,472**
**Claims priority, application Canada, Jun. 17, 1994, 2126155**
**Int. Cl.[6] E04B *1/38***
**U.S. Cl. 52—582.1** **8 Claims**

1. A kit of parts comprising blocks and interconnecting pieces to assemble said blocks end to end into a row, each block comprising two opposite end faces and each interconnecting piece comprising two opposite sides, said end faces of the blocks and said sides of the interconnecting pieces comprising respective mutually mating interconnecting elements, wherein the interconnecting elements of one of said interconnecting pieces mate with the interconnecting elements of the confronting end faces of each pair of consecutive blocks of said row to thereby fasten said confronting end faces together,



wherein (a) each block has a longitudinal axis, (b) the end faces of each block define a predetermine acute angle $90°-\alpha$ with the longitudinal axis of said block, and (c) each interconnecting piece is flat and comprises a tapered border defining an angle $\beta=2\alpha$ to fit between the confronting end faces of a pair of consecutive blocks of the row.

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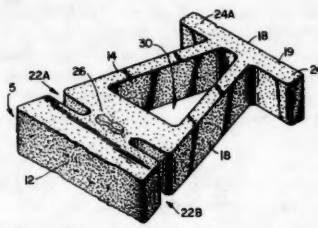
**5,490,363**
**COMPOSITE MASONRY BLOCK**
**Michael E. Woolford, Lake Elmo, Minn., assignor to Anchor Wall Sytems, Inc., St. Paul, Minn.**
**Continuation of Ser. No. 957,598, Oct. 6, 1992, abandoned.**
**This application Oct. 13, 1994, Ser. No. 322,357**
**Int. Cl.[6] E04C *1/00***
**U.S. Cl. 52—604** **27 Claims**



1. A pinless composite masonry block comprising a front surface, a back surface, a top surface and bottom surface, and first and second sides, said first side having a first inset wherein said first inset extends from said block top surface to said block bottom surface, said second side having a second inset wherein said second inset extends from said block top surface to said block bottom surface, said block comprising a protrusion on one of said top or bottom surfaces, said protrusion, configured to mate with the inset of one or more adjacently positioned blocks.

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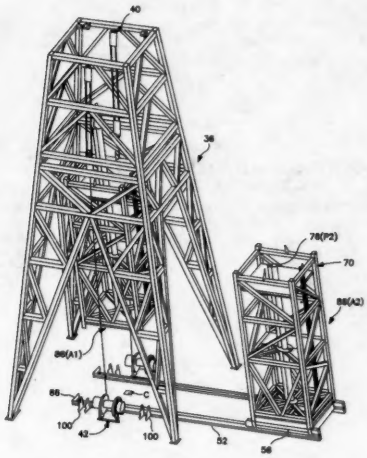
**5,490,364**
**TELESCOPIC FLARE PIPE TOWER**
**Vinod Desai, and Richard E. Tesch, both of Houston, Tex., assignors to Dreco, Inc., Houston, Tex.**
**Filed Aug. 30, 1994, Ser. No. 298,401**
**Int. Cl.[6] E04H *12/00***
**U.S. Cl. 52—637** **36 Claims**

1. A telescopic flare pipe tower for establishing a vertical positioned flare pipe above a base comprising:

a bottom section in contact with said base and having a plurality of sides at least one of said sides being open to receive additional sections,

a plurality of tower section assemblies each including a tower section serially received within said opening and telescopically raised above said bottom section,




each of said tower section assemblies having mutual connecting means between adjacent tower section assemblies to secure said tower section assemblies together above said bottom section,

each of said tower section assemblies also including a flare pipe section contained therein,

at least one securing means connected to each said tower section assembly for holding each said pipe section from selected movement relative to said tower section,

whereby upon serial telescopic erection of said tower section assemblies and mutual connecting of said tower sections, said pipe sections are serially connected to form a flare pipe.

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**5,490,365**

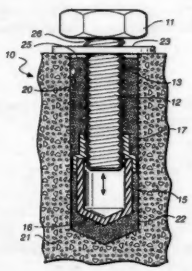
**ANCHOR BOLT ASSEMBLY**

**Steven A. Roth, 2891 Danville Blvd., Alamo, Calif. 94507**

**Filed May 11, 1994, Ser. No. 241,320**

**Int. Cl.[6] E04B** *1/38*

**U.S. Cl. 52—704** **4 Claims**




1. An anchor assembly for an adhesive-set anchor to hold a fixture to a structure through a hole in a foot of said fixture, comprising

an anchor member having a threaded shaft;

a hollow, cylindrical housing fixed to one end of said threaded shaft and extending a distance beyond said one end, said hollow housing having an inside diameter sufficient to contain said one end and an outside diameter adapted to be smaller than said hole in said foot;

a release for said adhesive, said release coating said threaded shaft.

**5,490,366**

**ADJUSTABLE WALL TIE**

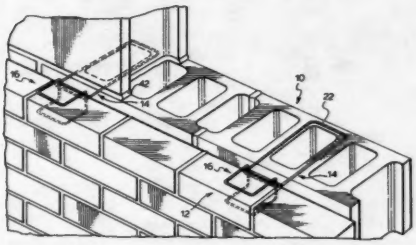
**William S. Burns, 12 Bristol Sands Crescent, Stouffville, Ontario, Canada, and Patrick J. Sweeney, 4 Chadbury Place, Agincourt, Ontario, Canada**

**Filed Dec. 27, 1994, Ser. No. 364,344**

**Claims priority, application Canada, Nov. 24, 1994, 2136700**

**Int. Cl.[6] E04B** *2/30;2/44*

**U.S. Cl. 52—713** **4 Claims**




1. An adjustable wall tie for securing spaced wythes each formed of courses of preformed block or brick, having cementing means for joining the courses together, said wythes defining a space therebetween, said wall tie comprising: a rectangular tension anchor having a base member and a pair of substantially parallel longitudinal side members extending from said base member perpendicular thereto, a transverse end member parallel to the base member joining the distal ends of the side members together, and an intermediate transverse member attached to the side members in proximity to said end member forming an elongated transverse slot therebetween, said tension anchor being adapted to be positioned whereby the base member can be cemented in one of said wythes with the opposite end member with the transverse slot disposed in the space between the wythes; a generally U-shaped double-ended hook having laterally spaced longitudinal side sections each comprised of vertically spaced upper and lower longitudinal members and vertical members joining said upper and lower members together at one end defining a web, and transverse base members joining the upper members together and the lower members together at an end opposite said one end to form a planar upper extension opposing and parallel to a planar lower extension joined by and extending from said web, the planar upper extension and the planar lower extension being adapted and positioned whereby the base members may be positioned in and cemented in the other of the said wythes with the web disposed in the space between the wythes and extending through the slot of the tension anchor for tying said wythes together.

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**5,490,367**

**APPARATUS FOR SUPPORTING AND MOVING VERTICALLY AN ERECTED FORM ASSEMBLY**

**Wen-Yuan Lee, 7F-3, No.8, Lane 390, Sec.1, Chien-Kang Rd., Tainan City, Taiwan, Prov. of China**

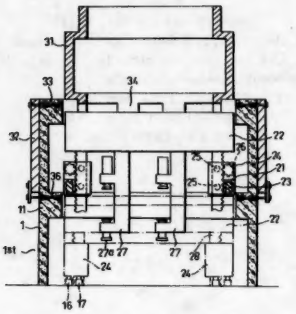
**Continuation-in-part of Ser. No. 910,527, Jul. 8, 1992, Pat. No. 5,329,742. This application May 17, 1994, Ser. No. 246,312**

**Int. Cl.[6] E04G** *11/02*

**U.S. Cl. 52—749.1** **3 Claims**

1. An apparatus for supporting and moving vertically an erected form assembly which is used to construct a building with a plurality of stories, said stories including a lower story and an upper story, each of said lower and upper stories being formed previously with a concrete wall structure which has surrounding walls formed integrally with reinforced horizontal beams that confine an interior space therebetween, said apparatus comprising:

a form support body that can extend across said interior space of said upper story and that has a bottom side and a top side on which said erected form assembly can rest;



a plurality of legs which extend downwardly from said form support body, each of said legs having a lower portion associated with a clamping unit in order to fix releasably said leg to one of said reinforced horizontal beams of said lower story;

at least one horizontal support bar which is located below and spaced from said form support body, said horizontal support bar being capable of extending across said interior space of said lower story and having two ends to be mounted releasably on said reinforced horizontal beams of said lower story; and

means for moving vertically said horizontal support bar with respect to said form support body, said moving means being connected to said form support body and said horizontal support bar.

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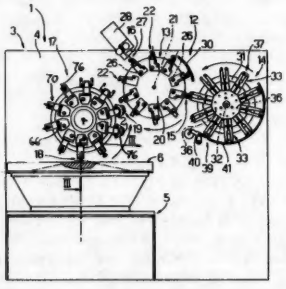
**5,490,368**

## WRAPPING MACHINE, PARTICULARLY FOR FOOD PRODUCTS SUCH AS SWEETS AND SIMILAR

**Mario Spatafora, Bologna, Italy, assignor to Azionaria Costruzioni Macchine Automatiche A.C.M.A. S.p.A., Bologna, Italy**

**Filed Jan. 28, 1994, Ser. No. 187,861**
**Claims priority, application Italy, Jan. 29, 1993, BO93A0021**
**Int. Cl.[6] B65B** *11/28*
**U.S. Cl. 53—234** **10 Claims**



1. A wrapping machine, particularly for food products, comprising an input station for an orderly succession of said products supplied to the input station in a given direction lying in a first plane, said input station being arranged on said first plane; a device for wrapping said products; a loading station for loading said products on to the wrapping device, said loading station being arranged on said first plane; and a transfer device for transferring said succession in said first plane from the input station to the loading station; the transfer device comprising at least a gripping device moving between the input and loading stations; and the gripping device comprising jaw means mounted for movement in a second plane for gripping a respective product at the input station, wherein said gripping device is rotated about a first axis lying in said first plane for selectively positioning said plane in a first position substantially coplanar, and in a second position substantially perpendicular, to said first plane.

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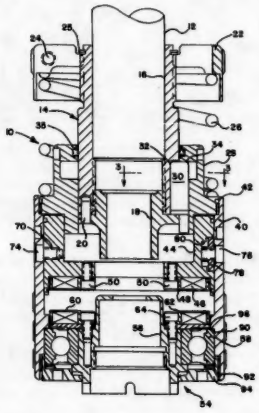
**5,490,369**

## CAPPING HEAD WITH MAGNETIC CLUTCH

**Darwin L. Ellis, Richmond, Ind.; James D. Duke, New Paris, Ohio, and David A. Willis, Economy, Ind., assignors to Aluminum Company of America, Pittsburgh, Pa.**

**Filed Oct. 24, 1994, Ser. No. 327,566**
**Int. Cl.[6] B67B** *3/20;* **B65B** *7/28*
**U.S. Cl. 53—317** **9 Claims**



1. A capping head assembly comprising a first housing assembly secured to a rotatable drive member, a second housing assembly including a quill mounted in said second housing assembly for free rotation relative to said first housing assembly, a magnetic clutch comprising a first ring of magnets in a torque ring that is slidably movable relative to said first housing assembly and a second ring of magnets in said second housing assembly axially spaced from said first ring of magnets, means for adjusting the position of said torque ring relative to said first housing assembly comprising a spiral slot in said first housing assembly, openings in said torque ring exposed through said slot and means extending through said slot into an opening to move said torque ring to the requisite position whereby the space between said magnets can be changed to vary the torque limit of said magnetic clutch and means for affixing said torque ring relative to said first housing assembly to retain said torque ring in a fixed position.

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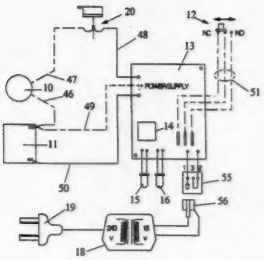
**5,490,370**

## BATTERY OPERATED ELECTRIC MACHINES

**John D. McNair, Olinda, and Aik P. Cheah, Clayton South, both of, Australia, assignors to Black & Decker Inc., Newark, Del.**

**Filed Aug. 18, 1993, Ser. No. 108,470**
**Claims priority, application Australia, Aug. 18, 1992, PL4179**
**Int. Cl.[6] A01D** *34/78*
**U.S. Cl. 56—11.9** **14 Claims**

1. A control apparatus for a rechargeable battery means of a battery powered lawn or grass mower, said control apparatus including monitoring means to monitor during use of the lawn or grass mower voltage discharge levels of the battery means, and disabling means operative in a first position to permit energization of the mower by said battery means and in a second position to inhibit the energization of the mower by said battery means, said




disabling means being responsive to said monitoring means to cause said disabling means to switch to said second position to disable said battery means from said mower upon said voltage discharge level dropping below a predetermined minimum level for the battery means, said disabling means remaining in said second position to prevent reuse of the mower until the battery means has been recharged through a complete recharging regime.

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**5,490,371**

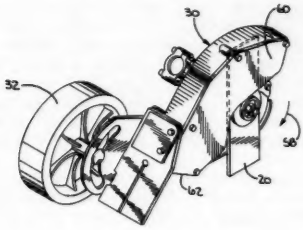
**DEBRIS GUARD FOR LAWN EDGER**

**Frank R. Potucek, III, Fox Lake, Ill., assignor to Echo Incorporated, Lake Zurich, Ill.**

**Filed Oct. 11, 1994, Ser. No. 321,420**

**Int. Cl.[6] A01D** *34/47;34/54;34/84*

**U.S. Cl. 56—17.2** **22 Claims**




**13**. A debris guard for a portable edger, said debris guard comprising:

a mounting portion for connecting the debris guard to a portable edger unit; and

two and only two flaps joined to the mounting portion with each of the flaps being repositionable relative to the other flap and the mounting portion.

**22**. An edger comprising:

a power unit;

a housing;

an elongate shaft connecting between the power unit and housing;

a cutting element;

first means for mounting the cutting element to at least one of the housing and shaft for movement relative to the housing in a predetermined path;

a debris guard; and

second means for mounting the debris guard in an operative position to at least one of the power unit, housing, and elongate shaft,

wherein the debris guard has independent flexible elements that are deflectable to conform to surfaces of different height to block passage of foreign matter propelled by the cutting element towards an operator.

**5,490,372**

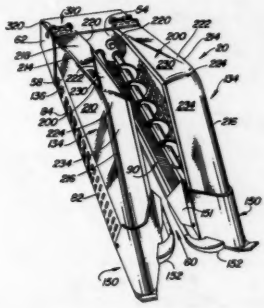
**COTTON HARVESTER**

**Francis E. Schlueter, Des Moines, Iowa, assignor to Deere & Company, Moline, Ill.**

**Continuation-in-part of Ser. No. 189,391, Jan. 26, 1994, Pat. No. 5,394,679, which is a division of Ser. No. 968,691, Oct. 30, 1992, Pat. No. 5,311,728. This application Jul. 19, 1994, Ser. No. 276,974**

**Int. Cl.[6] A01D** *46/12*

**U.S. Cl. 56—33** **18 Claims**




**1**. In a cotton harvester having a main frame supported for forward movement through a field of cotton planted in parallel rows, a row unit for stripping cotton from a row of plants, comprising:

a row unit housing supported by the frame;

first and second fore-and-aft extending stripper rolls supported for rotation in the housing and defining a row-receiving area;

first and second augers offset from the first and second stripper rolls, respectively, for conveying stripped cotton rearwardly;

a roll and auger drive connected to the first and second stripper rolls and the first and second augers; and

wherein the housing includes a fore-and-aft extending removable cover structure extending over the stripper rolls and augers, the cover structure comprising a plastic member including an upwardly directed outer wall having a first shape for funnelling cotton plants towards the row-receiving area, and an inner wall located above the augers and having a shape which differs from the first shape for maintaining stripped cotton within the housing and directing the stripped cotton toward preselected locations within the housing.

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**5,490,373**

**DEVICE AND METHOD FOR TRUING DOFFERS**

**Donald K. Davenport, Woodburn, and Joel M. Schreiner, Ankeny, both of Iowa, assignors to Deere & Company, Moline, Ill.**

**Filed Nov. 30, 1994, Ser. No. 346,670**

**Int. Cl.[6] A01D** *46/18*

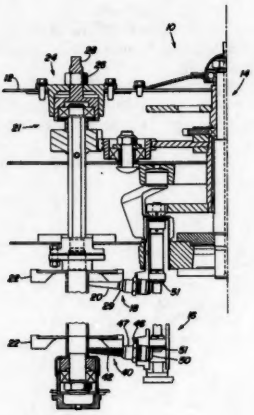
**U.S. Cl. 56—41** **15 Claims**

**1**. In a cotton harvester having an operable row unit with rows of spindles of preselected diameter and taper which pass adjacent a column of rotating doffers to unwrap cotton from the spindles, a method of truing the doffers so that a preselected clearance is provided between the rows of spindles and the doffers, the method comprising the steps of:

a. temporarily replacing at least one spindle in each row of spindles with a grinding device;

b. operating the row unit with the grinding device in place; and

c. moving the doffers towards the rows of spindles so each of the doffers is contacted by a grinding device and grinding the doffer with the grinding device while the row unit is operating.



5,490,374

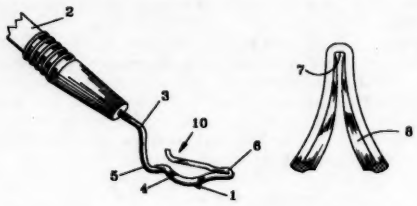
PLANT PULLER

Richard Calande, 39625 Makin Ave., Palmdale, Calif. 93551

Filed Oct. 20, 1994, Ser. No. 326,206

Int. Cl.[6] A01B *1/16;1/20*

U.S. Cl. 56—400.21 7 Claims



1. A device for pulling plants comprising a handle with a hook attached which hook has a leg and a foot with the foot having a tapered shape such that a heel end of the foot is wider than a toe end of the foot and the leg is bent such that the foot horizontal is approximately 45 degrees from the plane of the handle.

5,490,375

METHOD OF RESPINNING USING ANCILLARY YARN

Zdeněk Špindler; František Buryšek, both of Ústínad Orlicí ; Jiří Němec, Kostelec nad Orlicí ; Vojtěch Novotný, Ústí nad Orlicí ; Josef Lásko, Choceň ; Miroslav Blasel, Česká Třebová , and Oldřich Talacko, Žamberk, all of, Czechoslovakia, assignors to Elitex USTI Nad Orlici, Usti nad Orlici, Czechoslovakia

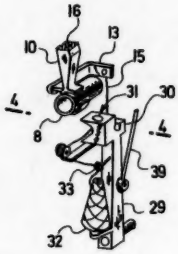
Continuation of Ser. No. 947,720, Sep. 18, 1993, Pat. No. 5,396,758. This application Nov. 30, 1994, Ser. No. 346,775

Claims priority, application Czechoslovakia, Sep. 23, 1991, 2899-91

Int. Cl.[6] D01H *4/50;15/02*

U.S. Cl. 57—263 4 Claims

1. A method of respinning using an attending device on an operating unit of an open-end spinning machine having a spinning unit, after replacement of a full bobbin by an empty tube using, for respinning, an ancillary yarn from an ancillary yarn unwinding means mounted on the attending device, the ancillary yarn having a beginning and the operating unit having a winding device for winding yarn on an empty tube, the method comprising the steps, in sequence, of:



displacing the beginning of said ancillary yarn toward the winding device;

fixing the beginning of said ancillary yarn at a point in said winding device for winding on an empty tube at a location on the tube for enabling removal of the ancillary yarn winding from the empty tube before a completion of respinning on the tube;

metering a predetermined length of the ancillary yarn from the point of its fixing in the winding device, by unwinding the ancillary yarn from the unwinding means, the ancillary yarn being led from the point of its fixing in the winding device in the direction of the spinning unit;

at the latest after the above steps have been carried out, inserting an empty tube into the winding device and fixing the ancillary yarn to the tube;

after the above steps have been carried out, severing the ancillary yarn at a further point established by the metering of said predetermined length of the ancillary yarn between said fixing point of the ancillary yarn in the winding device and the unwinding means of the ancillary yarn, thus creating a spinning-in end of the ancillary yarn and at the same time also a new beginning of the ancillary yarn situated on the unwinding means of the ancillary yarn, while the empty tube in the winding device contains no turns of ancillary yarn because the tube has not yet begun to rotate, with the empty tube in a stopped state;

moving the created spinning-in end of the ancillary yarn into the spinning unit for respinning, the first mentioned beginning of the ancillary yarn being fixed on the tube in the winding device; and

resuming a spinning connected with the beginning of the yarn winding on the tube in the winding device, before this time, no ancillary yarn having been wound on the tube.

5,490,376

GAS TURBINE SYSTEM

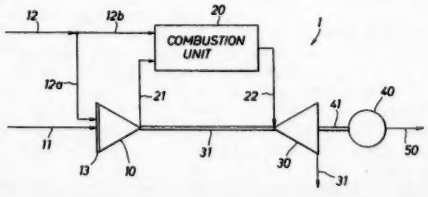
Maarten J. van der Burgt, The Hague, Netherlands, assignor to Shell Oil Company, Houston, Tex.

Filed Jun. 22, 1994, Ser. No. 263,913

Claims priority, application European Pat. Off., Jun. 23, 1993, 93201820

Int. Cl.[6] F02C *7/04*

U.S. Cl. 60—39.06 17 Claims




1. A method for operating a gas turbine system using low-Btu gaseous fuel, the method comprising feeding air to an annular

concentric air inlet in a compressor unit, compressing said air in said compressor unit, passing said compressed air to a combustion unit, combusting in said combustion unit said fuel with the compressed air both supplied to said combustion unit thereby obtaining hot product gas, and expanding in an expansion turbine unit hot product gas supplied thereto to drive the expansion turbine unit and to generate mechanical power, the method further comprising supplying low-Btu gaseous fuel to an annular concentric low-Btu gas inlet in said compressor unit, wherein said low-Btu gaseous fuel is not more than 20 percent by volume of the total volume of gas supplied to said compressor unit.

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**5,490,377**

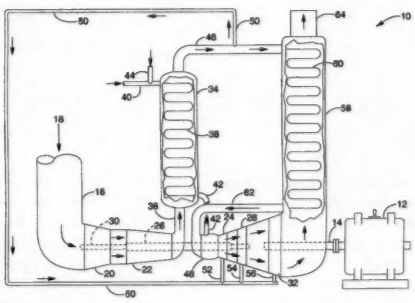
## PERFORMANCE ENHANCED GAS TURBINE POWERPLANTS

**Clarence W. Janes, Sacramento, Calif., assignor to California Energy Commission, Sacramento, Calif.**

**Continuation-in-part of Ser. No. 139,525, Oct. 19, 1993, abandoned. This application Jan. 12, 1994, Ser. No. 182,661**

**Int. Cl.[6] F02C** *3/28;7/10*

**U.S. Cl. 60—39.12** **24 Claims**



1. A gas turbine driven powerplant, comprising:

(a) compressor means for producing a downstream flow of air;

(b) heat exchanger means for cooling said downstream flow of air from said compressor means, said heat exchanger means positioned downstream of said compressor, said heat exchanger means including a fuel carrying coil;

(c) a regenerator positioned downstream of said heat exchanger means;

(d) cooling means for carrying a side stream of cooled air from said heat exchanger means to hot section components and/or auxiliary equipment, said cooling means positioned downstream of said heat exchanger means and upstream of said regenerator;

(e) a combustor positioned downstream of said regenerator, said combustor including a fuel inlet coupled to said fuel carrying coil of said heat exchanger means; and

(f) a turbine positioned downstream of said combustor.

**5,490,378**

## GAS TURBINE COMBUSTOR

**Johann Berger, Moosburg, and Burkhard Simon, Rohrmoos, both of, Germany, assignors to MTU Motoren- und Turbinen-Union Muenchen GmbH, Munich, Germany**

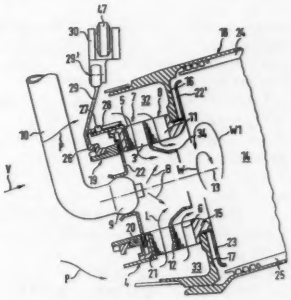
**PCT No. PCT/EP92/00425, § 371 Date Dec. 7, 1993, § 102(e) Date Dec. 7, 1993, PCT Pub. No. WO92/17736, PCT Pub. Date Oct. 15, 1992**

**PCT Filed Feb. 27, 1992, Ser. No. 122,493**

**Claims priority, application Germany, Mar. 30, 1991, 41 10 507.9**

**Int. Cl.[6] F23R** *3/14*

**U.S. Cl. 60—39.23** **21 Claims**



1. A burner having a fuel nozzle (**9**) for gas turbine engines, comprising:

a ring-shaped swirling device (**7**) coaxially arranged radially outward and downstream from a longitudinal axis (**13**) through said fuel nozzle (**9**), said swirling device (**7**) having an outer and an inner annular surface;

flow passages (**3**) equidistantly spaced along a circumference of said ring-shaped swirling device (**7**) for an adjustable feeding of combustion air, said flow passages (**3**) extending through said swirling device from the outer to the inner annular surface thereof in a skewed direction with respect to a radial from said longitudinal axis (**13**) and having same rectangular cross-sections along their entire length;

an annular sleeve member (**4**) arranged on the outer annular surface of said swirling device (**7**) so as to be displaceable in a direction of said longitudinal axis (**13**);

fingers (**5**) on said annular sleeve member (**4**) extending from an annular end face thereof and uniformly inclined inwardly into said flow passages and being displaceable in the direction of said longitudinal axis (**13**) within said flow passages (**3**);

said fingers (**5**) being arranged in parallel with respect to first and second internal walls of said flow passages (**3**) which opposingly face each other in the direction of said longitudinal axis (**13**) and which limit a maximal adjusting path of said fingers on said sleeve;

wherein in each adjusted position, spaces are formed between said fingers (**5**) and said second internal walls, said spaces providing constant flow cross-sections for the combustion air inside said flow passages (**3**) over an entire length thereof.

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**5,490,379**

## FUEL METERING UNIT

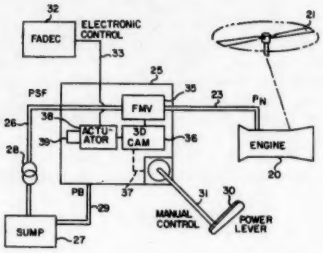
**Donald E. Wernberg, Rockford, Ill.; Gregory A. Molenaar, Loveland, Colo., and Daniel F. Miller, Beloit, Wis., assignors to Woodward Governor Company, Rockford, Ill.**

**Filed Dec. 20, 1993, Ser. No. 182,444**

**Int. Cl.[6] F02C** *9/28*

**U.S. Cl. 60—39.281** **19 Claims**

1. A fuel metering unit for an aircraft gas turbine engine having both electronic and manual controls, the fuel metering unit comprising, in combination:




a supply inlet connected to receive fuel at an elevated pressure from a fuel supply, a metered outlet connected to the engine for providing metered fuel flow thereto, a bypass outlet for returning excess fuel flow to the supply;

a fuel metering valve connected between the inlet and the metered outlet for metering the outlet;

a bypass valve for maintaining a substantially constant pressure drop for the fuel metering valve;

a 3-dimensional (3-D) cam having a complex surface for driving a follower to control the fuel metering valve, the three-dimensional cam having one control axis adapted for manual control and another control axis adapted for electronic control;

mechanical means coupling a power lever to the cam for adjustment along the manual control axis to provide manual fuel control;

an electrical actuator coupling the electronic control to the cam for adjustment along the electronic control axis for providing electronic fuel control;

and detent means providing a holding force for locking the actuator in position upon transfer from electronic to manual control thereby to accomplish said transfer without causing a transient in fuel valve position.

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**5,490,380**

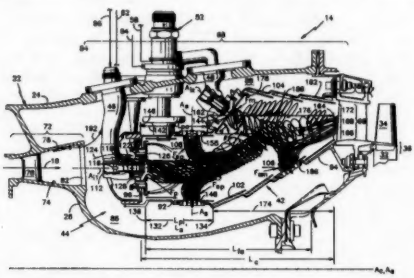
## METHOD FOR PERFORMING COMBUSTION

**Richard L. Marshall, Manchester, Conn., assignor to United Technologies Corporation, Hartford, Conn.**

**Division of Ser. No. 898,053, Jun. 12, 1992, Pat. No. 5,406,799. This application Jul. 26, 1994, Ser. No. 280,630**

**Int. Cl.[6] F02C** *7/26*

**U.S. Cl. 60—39.06** **7 Claims**



1. A method for operating a combustion chamber of an axial flow rotary machine, the combustion chamber extending axially and having a pilot zone extending in an axially oriented direction having at least one means for injecting zone extending in an axially oriented direction having at least one means for injecting swirling columns of gases including means of injecting swirling columns of fuel and oxidizer fluid into the axially extending pilot zone and burning the columns of fuel and oxidizer fluid, and, having a divergent outer wall in a main zone immediately adjacent to the pilot zone, the divergent outer wall in the main zone having a plurality of injectors having means for injecting swirling streams of gases in the low power and high power operative conditions, which comprises:

burning the fuel and oxidizer fluid in the combustion chamber while flowing the gases in the axial direction including the step of forming a plurality of circumferentially spaced swirling columns of gases which extend to the downstream end of the pilot zone and into the main zone;

impacting these turbulent streams of swirling gases with a plurality of circumferentially swirling streams of gases in the main zone extending from the divergent outerwall that are angled inwardly toward the turbulent streams at low power and high power operative conditions, the swirling gases in the main zone containing only air at low power operative conditions and air and fuel at high power operative conditions.

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**5,490,381**

## NEED-BASED METHOD OF HEATING A CATALYST IN THE EXHAUST SYSTEM OF AN INTERNAL COMBUSTION ENGINE

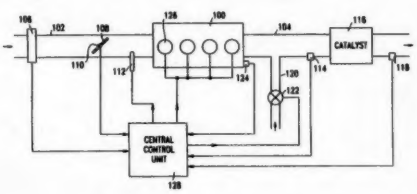
**Ruediger Becker, Murr, Germany, assignor to Robert Bosch GmbH, Stuttgart, Germany**

**Filed Jul. 7, 1994, Ser. Nc. 271,928**

**Claims priority, application Germany, Jul. 12, 1993, 43 23 243.4**

**Int. Cl.[6] F01N** *3/20*

**U.S. Cl. 60—274** **12 Claims**




1. A method of heating a catalyst in an exhaust-gas system of an internal combustion engine, the method comprising the steps of:

measuring at least two values, with at least one value representative of a condition before conversion by the catalyst and at least one value representative of a condition after conversion by the catalyst;

determining a converting power of the catalyst from the at least two measured values; and

heating the catalyst as a function of the converting power of the catalyst,

wherein the heating step includes heating the catalyst using a first set of measures if a lambda control of the internal combustion engine is not active and terminating the first set of measures as a result of the occurrence of an event selected from the group of events consisting of:

an activation of the lambda control,

an expiration of a first time interval since a starting of the internal combustion engine,

an expiration of the first time interval since a deactivation of the lambda control,

a surpassing of a first load integral threshold value by a load integral integrated since the starting of the internal combustion engine, and

a surpassing of the first load integral threshold value by a load integral integrated since the deactivation of the lambda control.

**5,490,382**

## CATALYZER SUPPORT SYSTEM FOR EXHAUST CLEANING OF OUTBOARD MTOR

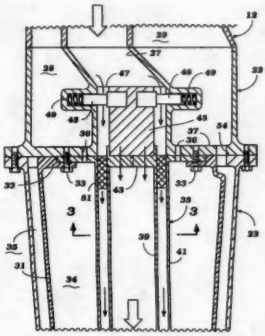
**Masahiko Kato, Hamamatsu, Japan, assignor to Sanshin Kogyo Kabushiki Kaisha, Hamamatsu, Japan**

**Division of Ser. No. 126,913, Sep. 24, 1993. This application Apr. 17, 1995, Ser. No. 423,043**

**Claims priority, application Japan, Sep. 26, 1992, 4-279196**

**Int. Cl.[6] F01N** *3/28*

**U.S. Cl. 60—297** **2 Claims**



**1**. A catalytic exhaust treatment system for an outboard motor comprised of an internal combustion engine having an exhaust outlet port, an exhaust pipe having an inlet end communicating with said exhaust port, an outlet end and an inner surface defining a gas flow path from said inlet end to said outlet end for communicating exhaust gases to the atmosphere, a catalyst support in said exhaust pipe, a catalyst supported on said catalyst support and having an outer periphery spaced inwardly from said inner surface of said exhaust pipe, and a filter for filtering only the exhaust gases that flow through the area between said catalyst and the inner surface of said exhaust pipe.

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**5,490,383**

## METHOD OF PRESSURE CONTROLLING A HYDROSTATIC MACHINE HAVING AN ADJUSTABLE DELIVERY VOLUME

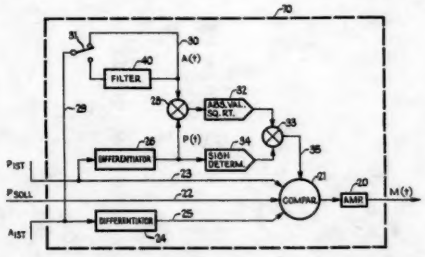
**Karsten Müller, Lohr/Main, and Jörn Glotzbach, Darmstadt, both of, Germany, assignors to Mannesmann Rexroth GmbH, Germany**

**Filed Aug. 12, 1994, Ser. No. 289,768**

**Claims priority, application Germany, Aug. 13, 1993, 43 27 313.0**

**Int. Cl.[6] F16D** *31/00;31/02;* **F15B** *13/16*

**U.S. Cl. 60—327** **7 Claims**




**1**. A method for pressure controlling a hydrostatic machine applying pressurized fluid to a hydraulic system, said machine having an adjustable delivery volume defined by a pivot angle of said machine and including an adjusting means for setting the pivot angle of said machine to determine a certain delivery volume, a continuously operable valve and a control loop having a damping factor for generating a pressure control signal by subtracting an actual pressure value from a desired pressure value, said control signal being supplied to the continuously operable valve for actuating said adjusting means, the method comprising the steps of: differentiating the actual pressure value to produce a pressure change value, multiplying the pressure change value by the pivot angle value to produce a product defining a correcting quantity, and subtracting the product from the desired pressure value to keep the damping factor of the control loop constant and independent of different volumes of the hydraulic system to which said machine supplies fluid.

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**5,490,384**

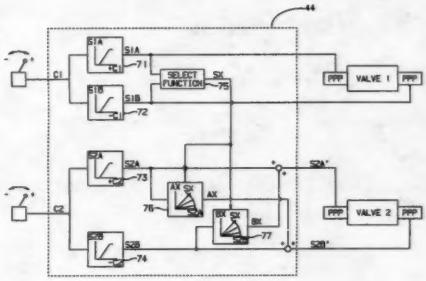
## HYDRAULIC FLOW PRIORITY SYSTEM

**Stephen V. Lunzman, Chillicothe, Ill., assignor to Caterpillar Inc., Peoria, Ill.**

**Filed Dec. 8, 1994, Ser. No. 351,919**

**Int. Cl.[6] F16D** *31/00;* **F15B** *11/08*

**U.S. Cl. 60—327** **6 Claims**




**1**. A hydraulic system for a construction machine comprising a pump for delivering fluid under pressure from a fluid reservoir to at least first and second main valves, said second main valve including first and second pilot valves, comprising:

first and second input means for producing first and second control signals, respectively, said first and second control signals being indicative of a desired operation of the hydraulic system, said second input means being moveable in two directions;

first modulation means for producing first and second actuator signals as a function of said first control signal, said first and second actuator signals being delivered to control said first main valve;

second modulation means for producing third and fourth actuator signals as a function of said second control signal, said third actuator signal being delivered to a first pilot valve associated with said second main valve in response to said second input means being moved in a first direction and said fourth actuator signal being delivered to a second pilot valve in response to said second input means being moved in a second direction;

means for producing a first compensating signal in response to said second input means being moved in a first direction, said first compensating signal being a function of said first and second actuator signals and said fourth actuator signal, said first compensating signal being delivered to a second pilot valve associated with said second main valve;

means for producing a second compensating signal in response to said second input means being moved in a second direction, said second compensating signal being a function of said

first and second actuator signals and said third actuator signal, said second compensating signal being delivered to a first pilot valve associated with said second main valve.

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**5,490,385**

## VALVE RANGE

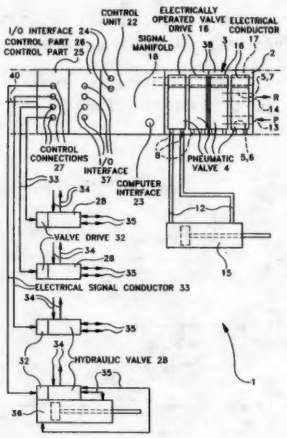
**Kurt Stoll, Esslingen, and Thomas Lederer, Kernen, both of, Germany, assignors to Festo KG, Esslingen, Germany**

**Filed Mar. 25, 1994, Ser. No. 218,121**

**Claims priority, application Germany, Apr. 20, 1993, 43 12 729.0**

**Int. Cl.[6] F16D** *31/02*

**U.S. Cl. 60—368** **14 Claims**




1. A valve range for use in connection with the control of fluid-operated devices, comprising:

a fluid manifold provided with internal fluid ducts, at least one of said ducts being a supply duct and at least another of said ducts being a spent air venting duct;

electrically operated pneumatic valves, said pneumatic valves communicating with said fluid ducts, said fluid manifold being fitted with said pneumatic valves;

valve drives for said electrically operated pneumatic valves;

a signal manifold, said signal manifold providing first electrical signals for the operation of said pneumatic valves;

an electrical conductor arrangement provided along said fluid manifold, said electrical conductor arrangement being connected to said valve drives for said pneumatic valves, said conductor arrangement being further connected to said signal manifold for transmission of said first electrical signals for the operation of said pneumatic valves;

an electrically operated hydraulic valve;

an electrically operable drive for said hydraulic valve;

a control connection for connection with said electrically operable drive of said hydraulic valve, said control connection being electrically connected to said signal manifold, said signal manifold providing at least a second electrical signal through said control connection for operation of said hydraulic valve;

a control unit associated with said signal manifold, said control unit containing a program that controls said first electrical signals and said second electrical signal for control of said pneumatic valves and said hydraulic valve, respectively.

**5,490,386**

## METHOD FOR COOLING A LOW PRESSURE STEAM TURBINE OPERATING IN THE VENTILATION MODE

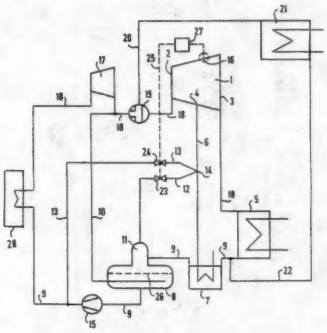
**Herbert Keller, and Dietmar Bergmann, both of Mülheim, Germany, assignors to Siemens Aktiengesellschaft, Munich, Germany**

**Filed Mar. 7, 1994, Ser. No. 206,798**

**Claims priority, application Germany, Sep. 6, 1991, 41 29 518.8**

**Int. Cl.[6] F01D** *25/12;* **F01K** *7/34*

**U.S. Cl. 60—660** **15 Claims**



1. A method for cooling a low pressure steam turbine operating in a ventilation mode, which comprises:

delivering steam through a closable inlet of a low pressure steam turbine when operating in a power generation mode and blocking off the closable inlet when operating in a ventilation mode;

feeding steam from an outlet of the low pressure steam turbine to a condenser for condensing the steam to condensate;

diverting at least one of the steam and the condensate from a bleed port between the inlet and the outlet through a bleed pipe to a preheater during operation in the power generation mode; and

supplying steam from outside the low pressure steam turbine through a steam transfer pipe to the bleed pipe in the ventilation mode.

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**5,490,387**

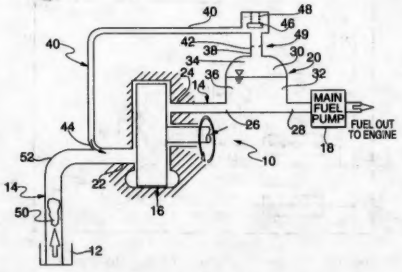
## FLAME-OUT RESISTANT FUEL PUMPING SYSTEM

**Bernard J. Bisson, Winsted, and George L. Bennett, Hebron, both of Conn., assignors to Coltec Industries Inc, New York, N.Y.**

**Filed May 25, 1994, Ser. No. 249,115**

**Int. Cl.[6] F02C** *7/22*

**U.S. Cl. 60—734** **20 Claims**




1. A fuel pumping system for delivering fuel to an engine, comprising:

a fuel supply tank for supplying fuel to be delivered to the engine;

a fuel transfer circuit for directing fuel from said fuel supply tank to the engine;

a fuel boost pump positioned along said fuel transfer circuit between said fuel supply tank and the engine for displacing fuel through said fuel transfer circuit from said fuel supply tank toward the engine, said fuel boost pump including a pump inlet and a pump discharge outlet;

an accumulator means positioned along said fuel transfer circuit between said pump discharge outlet and the engine for accumulating vapor and fuel so as to provide a reserve supply of fuel to the engine while minimizing the amount of undissolved vapor delivered to the engine; and a return conduit having an inlet end communicating with said accumulator means and an outlet end communicating with said fuel transfer circuit between said fuel supply tank and said accumulator means, said return conduit operating to direct vapor or vapor and fuel from said accumulator means into said fuel transfer circuit.

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**5,490,388**

## GAS TURBINE COMBUSTION CHAMBER HAVING A DIFFUSER

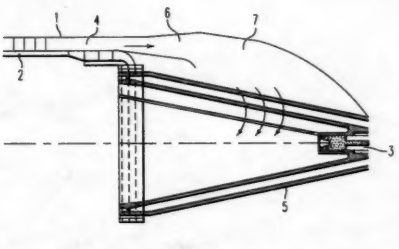
**Rolf Althaus, Kobe, Japan, and Burkhard Schulte-Werning, Basel, Switzerland, assignors to Asea Brown Boveri Ltd., Baden, Switzerland**

**Continuation-in-part of Ser. No. 124,006, Sep. 21, 1993, abandoned. This application Sep. 22, 1994, Ser. No. 310,393**

**Claims priority, application Germany, Sep. 28, 1992, 42 32 442.4**

**Int. Cl.[6] F02C** *3/14*

**U.S. Cl. 60—737** **3 Claims**




1. A gas turbine combustion chamber comprising:

an outer casing of the combustion chamber;

an imperforate inner casing of the combustion chamber positioned within said outer casing and spaced from said outer casing so as to form a cooling duct therebetween, through which cooling gas may flow for cooling the combustion chamber;

a premixing burner positioned at a downstream end of said inner casing in a cooling gas flow direction;

a plenum defined around said burner and having an intake connected to said cooling duct so as to receive the cooling gas from said cooling duct; and

a diffuser extending into said plenum from said downstream end of said inner casing, said diffuser having an intake located in the same plane as the plenum intake and being configured so as to recover a maximum amount of the dynamic pressure of the cooling gas flowing from said cooling duct into said plenum.

**5,490,389**

## COMBUSTOR HAVING ENHANCED WEAK EXTINCTION CHARACTERISTICS FOR A GAS TURBINE ENGINE

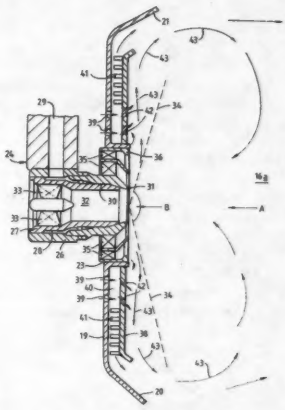
**Andrew Harrison, and Keith Park, both of Derby, England, assignors to Rolls-Royce plc, London, England**

**Continuation of Ser. No. 150,088, Nov. 19, 1993, abandoned. This application Apr. 3, 1995, Ser. No. 415,747**

**Claims priority, application United Kingdom, Apr. 13, 1992, 9112324**

**Int. Cl.[6] F02C** *1/00*

**U.S. Cl. 60—737** **6 Claims**




1. A gas turbine engine combustor comprising a combustion chamber (**16**) having an upstream heat-shield (**38**) surface with plural holes (**42**) therein for directing cooling air therethrough for flow over the downstream heat-shield (**38**) surface and having at least one fuel injector (**24**) for injecting a mixture of fuel and air into said combustion chamber (**16**), said fuel injector (**24**) being so configured that said fuel and air mixture is nominally injected about an axis into said combustion chamber (**16**) in the general form of a hollow cone (**34**) defined about the axis, characterized in that the angle (B) of said cone (**34**) and the velocity of said injected fuel and air mixture are arranged to be such that together they result in the injected fuel and air mixture creating a low pressure zone adjacent the heat shield (**38**) surface to cause said injected fuel and air mixture to flow generally away from the axis and parallel with said heat-shield surface (**38**), the hole (**42**) directing cooling air intermediate the heat shield (**38**) surface and the low pressure zone and at an angle relative the heat shield surface (**38**) so that the cooling air flow does not oppose said flow of said fuel and air mixture, at least some of said fuel and air mixture changing direction to flow toward the axis to effect a flow recirculation zone immediately downstream of the heat shield (**38**) surface.

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**5,490,390**

## LIQUEFACTION OF CHLORINE OR OTHER SUBSTANCES

**James H. Boyette; Leo C. Comeaux; Angel L. Siso; J. Douglas Mansell, all of Calcasieu Parish, La., and Jonn E. Fike, Jr., Pittsburgh, Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.**

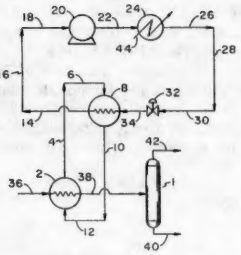
**Filed May 13, 1994, Ser. No. 242,809**

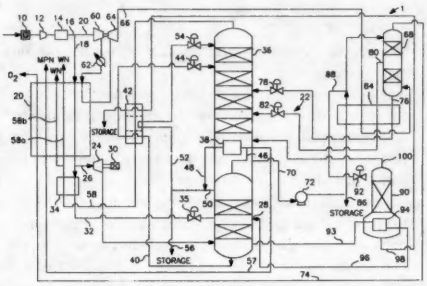
**Int. Cl.[6] F25J** *1/00*

**U.S. Cl. 62—9** **25 Claims**

1. A process for liquifying a substance comprising:

(a) transferring latent heat from said substance in the gaseous state to a first heat transfer fluid passing through a first loop wherein said first heat transfer fluid is substantially isolated from said substance;





(b) transferring heat from said first heat transfer fluid to a second heat transfer fluid passing through a second loop wherein said second heat transfer fluid is substantially isolated from said substance and from said first heat transfer fluid; and

(c) transferring heat from said second heat transfer fluid to a third heat transfer fluid wherein said third heat transfer fluid is substantially isolated from said substance, from said first heat transfer fluid, and from said second heat transfer fluid;

wherein said first heat transfer fluid is selected from the group consisting of:

(d) at least one perhalogenated methane represented by the formula $CCl_{(4-i)}F_i$ where i is 1, 2, 3, or 4;

(e) at least one perhalogenated ethane represented by the formula $C_2Cl_{(6-j)}F_j$ where j is 3, 4, 5, or 6;

(f) at least one perhalogenated propane represented by the formula $C_3Cl_{(8-k)}F_k$ where k is 4, 5, 6, 7, or 8;

(g) at least one halogenated ethane represented by the formula $C_2HCl_{(5-x)}F_x$ where x is 3, 4, or 5;

(h) at least one halogenated propane represented by the formula $C_3HCl_{(7-y)}F_y$ where y is 4, 5, 6, or 7;

(i) at least one perfluorinated normal alkane containing from 4 to 8 carbon atoms;

(j) at least one perhalogenated cyclobutane represented by the formula $C_4Cl_{(8-z)}F_z$ where z is 6, 7, or 8;

(k) perfluoro-1,3-dimethylcyclohexane;

(l) perfluoro(methyldecalin);

(m) carbon dioxide; and

(n) a mixture thereof,

and wherein said substance is selected from the group consisting of:

(o) molecular chlorine,

(p) molecular bromine,

(q) hydrogen fluoride,

(r) hydrogen chloride, and

(s) hydrogen bromide.

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**5,490,391**

**METHOD AND APPARATUS FOR PRODUCING OXYGEN**

**Neil Hogg, Summit, and Joseph Straub, North Haledon, both of N.J., assignors to The BOC Group, Inc., New Providence, N.J.**

**Filed Aug. 25, 1994, Ser. No. 295,951**
**Int. Cl.[6] F25J** *3/04*
**U.S. Cl. 62—38** **12 Claims**

1. An air separation method for producing a gaseous oxygen product at a delivery pressure:

separating the air by a low temperature rectification process operating in accordance with a Claude cycle to produce liquid oxygen, said low temperature rectification process including filtering, compression and purification stages, a cooling stage to cool said air, a rectification stage employing higher and lower pressure columns connected to one another in a heat transfer relationship to separate the air and thereby produce liquid oxygen as a column bottom of the lower pressure column, and a Claude expander to expand at least a major portion of the air into said higher pressure column and with the performance of work;

forming a supplemental refrigerant stream having substantially said delivery pressure;

pumping a stream of said liquid oxygen from said lower pressure column to substantially said delivery pressure;

vaporizing said liquid oxygen by introducing said stream of said liquid oxygen into a top region of a mixing column and introducing said supplemental refrigerant stream into a bottom region of said mixing column, thereby collecting a liquid in said bottom region of said mixing column;

removing a product stream from the top region of said mixing column to form said gaseous oxygen product; and

removing a liquid stream composed of said liquid, pressure reducing said liquid stream, and introducing said liquid stream into an intermediate location of said lower pressure column.

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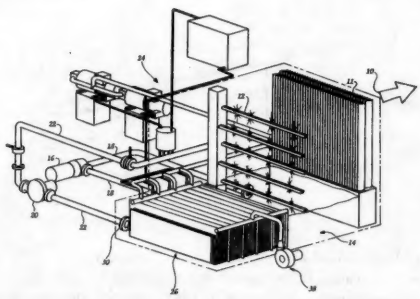
**5,490,392**

**HEAT TRANSFER METHOD AND APPARATUS**

**Roger D. Williams, Dallas, and Mark S. Gengler, Shelby, both of N.C., assignors to Pneumafil Corporation, Charlotte, N.C.**

**Filed Oct. 31, 1994, Ser. No. 332,355**
**Int. Cl.[6] F28G** *13/00*
**U.S. Cl. 62—91** **19 Claims**



8. A method of cooling and conditioning air, comprising:

moving air along a predetermined flow path;

providing a cooling stage in said flow path of said air, said cooling stage cooling said air by spraying water into said moving air;

circulating water through heat transfer means to chill said water, said heat transfer means having a heat transfer surface over which said water flows;

maintaining said heat transfer surface at a temperature less than the temperature of said water by circulating a heat exchange fluid in relation to said heat transfer surface, said heat exchange fluid having a temperature less than the temperature of said water;

discharging air into said water to form a stream of air bubbles in said water and locating said air stream discharge so as to cause said stream of air bubbles to pass along said heat

transfer surface in close proximity thereto, whereby said bubble air stream improves heat transfer between said heat transfer surface and said water and assists in cleaning from said exterior surfaces of said heat transfer surface any foreign matter which may have collected thereon; and

circulating said cooled water to said cooling stage for spraying therefrom.

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**5,490,393**

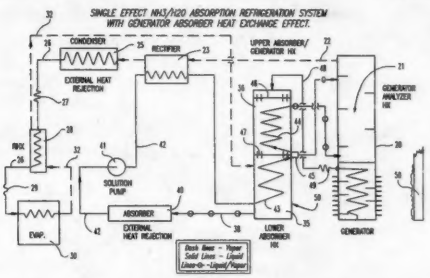
## GENERATOR ABSORBER HEAT EXCHANGER FOR AN AMMONIA/WATER ABSORPTION REFRIGERATION SYSTEM

**Dale A. Fuesting, Newburgh; William E. Stephan, Evansville, and Richard H. Merrick, Newburgh, all of Ind., assignors to Robur Corporation, Evansville, Ind.**

**Filed Mar. 31, 1994, Ser. No. 220,299**

**Int. Cl.[6] F25B** *15/00*

**U.S. Cl. 62—101** **12 Claims**




1. An absorption machine having a single heat transfer loop and requiring only one heat transfer solution, said absorption machine comprising:

(a) a generator, a condenser, an evaporator and an absorber;

(b) a refrigerant pathway operatively connecting the generator to the condenser, the condenser to the evaporator, and the evaporator to the absorber;

(c) a weak solution pathway from the generator to the absorber;

(d) a strong solution pathway from the absorber to the generator; and

(e) a generator/absorber heat exchanger simultaneously disposed in the strong solution pathway and the weak solution pathway;

wherein said strong solution pathway includes a first subpathway and a second subpathway, wherein the first subpathway directs strong solution to said generator at a first temperature and concentration, while the second subpathway directs strong solution to said generator at a second temperature and concentration; and further wherein said weak solution pathway routes weak solution through a first absorption step in said generator/absorber to a second absorption step in said absorber with substantially all of the weak solution that passes through said first absorption step being routed to said second absorption step.

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**5,490,394**

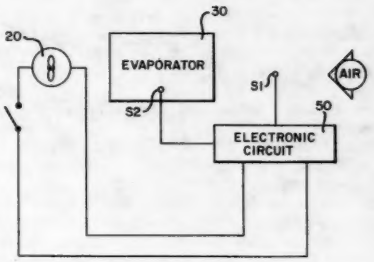
## FAN CONTROL SYSTEM FOR THE EVAPORATOR OF REFRIGERATING APPLIANCES

**Marco E. Marques, and Roberto D. Brun, both of Joinville, S.C., assignors to Multibrás S/A Eletrodomésticos, São Paulo, Brazil**

**Filed Sep. 23, 1994, Ser. No. 311,775**

**Int. Cl.[6] F25D** *17/06*

**U.S. Cl. 62—186** **8 Claims**




1. A fan control system for the evaporator of refrigerating appliances, of the type in which the internal air is forced to circulate, by action of a fan, through the evaporator of a refrigerating circuit, fed by a compressor comprising:

a first temperature sensing means disposed to detect the temperature of the air inside the refrigerating appliance at the air inlet of the evaporator;

a second temperature sensing means disposed to detect the temperature of the evaporator;

a control circuit, operatively connected to said first and second temperature sensors and to said fan and producing, in response to the temperature values detected by said sensors: a fan stop control signal, when the difference between the values of the temperature detected by said first and second sensors reaches a stop value, below which the heat transfer from the forced circulating air to the evaporator is lower than the heat transfer from said fan to said air; and a fan start control signal, when said difference between the temperature values reaches, with the reduction of the temperature of the evaporator, due to the compressor operation, a certain start value corresponding to a temperature of the evaporator substantially lower than the temperature of the air in the internal medium.

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**5,490,395**

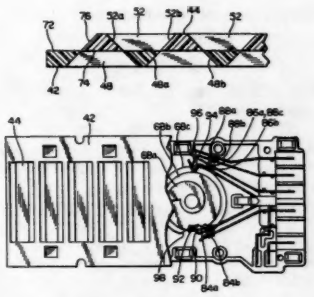
## AIR BAFFLE FOR A REFRIGERATOR

**Stephen G. Williams, Ohio Township, Warrick County; Ronald W. Guess, and Lori A. Cook, both of Scott Township, Vanderburgh County, all of Ind., assignors to Whirlpool Corporation, Benton Harbor, Mich.**

**Filed Nov. 21, 1994, Ser. No. 342,972**

**Int. Cl.[6] F25D** *17/04*

**U.S. Cl. 62—187** **17 Claims**




1. In a refrigerator having a cabinet defining a freezer compartment and a fresh food compartment separated from each other by a divider wall, the divider wall having an air passage for communicating between said compartments, said refrigerator further having an evaporator disposed in said freezer compartment, a compressor fluidly connected with said evaporator for moving refrigerant therethrough, and an evaporator fan for moving air over the evaporator wherein a power supply is selectively connected to said

compressor and evaporator, a system for controlling fair circulation within the fresh food compartment comprising:

a baffle positioned within said air passage and being positionable in an open or closed position for selectively opening and closing said air passage;

a motor;

a cam drivingly interconnected with said motor and coupled to said baffle such that rotation of said cam operates to selectively move said baffle to said open or closed position;

a thermostat for sensing temperature within said fresh food compartment;

a first switch operatively associated with said cam for selectively connecting said motor with said power source such that said baffle may be move from said closed position to said open position when said thermostat indicates said fresh food compartment requires cooling; and

a second switch operatively associated with said cam for selectively connecting said motor with said power source such that said baffle may be moved from said open position to said closed position when said thermostat indicates said fresh food compartment does not require cooling.

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**5,490,396**

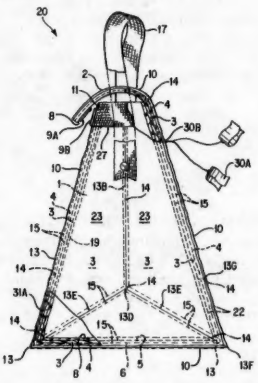
**PORTABLE COOLING CONTAINER**

**Richard Morris, P.O. Box 821003, South Florida, Fla. 33082**

**Filed Sep. 7, 1993, Ser. No. 116,803**

**Int. Cl.[6] F25D** *3/08*

**U.S. Cl. 62—457.2** **11 Claims**



**1**. A container comprising a floor, walls and lid, said walls including a terminal end defining a mouth opening and said container including:

an outer skin material means comprising liquid resistant and non-porous flexible skin material defining the outer surfaces of a floor, walls and lid,

an inner skin material means comprising liquid resistant and non-porous flexible skin material spaced from said outer skin material means defining chamber means between the outer and inner skin material means,

an attached lid sized to span said container mouth opening including means to attached to said container for opening and closing said mouth opening, said lid comprising a peripheral zone with seal means comprising a downwardly facing surface including attaching means confronting and to be attached to the container walls to form a seal between said lid and said walls,

a gel means in the chamber means between the skin material means, including within said lid, to be cooled to maintain the interior of the container in a cooled condition,

said gel means in said chamber means conforming to said chamber means, whereby said container and said gel means will be flexible and will fold when said container is compressed,

wherein, when said container is compressed, said flexible inner and outer material skin means of said walls, floor and lid of said container will fold into a relatively flat position.

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**5,490,397**

**WATER REMOVING DEVICE IN REFRIGERATING SYSTEM**

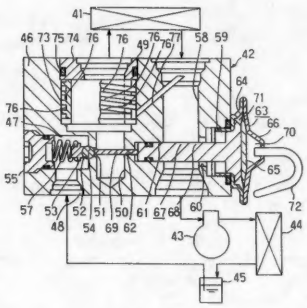
**Keiichi Kitamura, Handa; Shin Honda, Nagoya, and Hisayoshi Sakakibara, Nishio, all of, Japan, assignors to Nippondenso Co., Ltd., Kariya, Japan**

**Continuation of Ser. No. 322,767, Oct. 13, 1994, abandoned, which is a continuation of Ser. No. 188,320, Jan. 28, 1994, abandoned, which is a division of Ser. No. 868,301, Apr. 14, 1992, Pat. No. 5,301,520. This application Dec. 19, 1994, Ser. No. 358,930**

**Claims priority, application Japan, Apr. 15, 1991, 3-082675; Dec. 26, 1991, 3-345134; Feb. 5, 1992, 4-020313**

**Int. Cl.[6] F25B** *43/04;47/00*

**U.S. Cl. 62—474** **8 Claims**



**1**. A water removing device for a refrigerating system including a compressor, a condenser, a receiver, an expansion valve and an evaporator, said device comprising:

a body block integrally forming said expansion valve therein and formed with a pair of refrigerant passages, one passage connecting said receiver to said evaporator and the other passage connecting said evaporator to said compressor;

first bypass passage means provided in said body-block for leading a portion of a refrigerant entering into said other passage toward said one passage;

a cooling cylinder fitted in said one passage and having an inner passage for a refrigerant flow from said receiver to said evaporator and an outer passage connected to said first bypass passage means for allowing said portion of said refrigerant from said other passage to flow therethrough so that said portion of refrigerant is cooled and water is separated therefrom;

second bypass passage means provided in said body block and connected at an outlet side to said outer passage of said cooling cylinder; and

filter means provided in said body block at an outlet side of said second bypass passage means for collecting therein said water separated by said cooling cylinder so that said portion of refrigerant is passed therethrough and further including returning means for returning said portion of said refrigerant to said other passage.

**5,490,398**

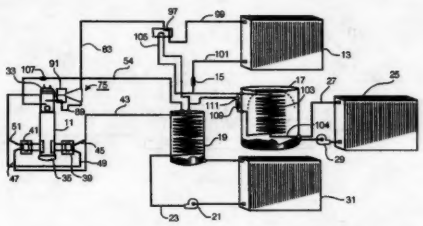
## HIGH EFFICIENCY ABSORPTION COOLING AND HEATING APPARATUS AND METHOD

**Calvin D. Cline, Weatherford, Tex., assignor to Airex Research and Development, Inc., Weatherford, Tex.**

**Continuation-in-part of Ser. No. 31,664, Mar. 15, 1993, abandoned. This application Apr. 26, 1994, Ser. No. 233,304**

**Int. Cl.**[6] **F25B** *33/00;15/00*

**U.S. Cl. 62—497** **9 Claims**



**1**. A method for providing a high efficiency absorption refrigeration system comprising the steps of:

circulating an absorbent/refrigerant fluid in a fluid flow loop containing at least a condenser, a metering device, an evaporator, an absorber and a generator chamber;

coupling a microwave energy source comprising at least one magnetron to the generator chamber for providing a heat source to increase the temperature of the absorbent/refrigerant fluid being circulated in the fluid flow loop, thereby releasing refrigerant vapor from the absorbent/refrigerant fluid;

subjecting the absorbent/refrigerant fluid in the generator chamber to an ionizing current in addition to the microwave energy source in order to further facilitate the release of refrigerant vapor from the absorbent/refrigerant fluid within the generator chamber;

passing the refrigerant vapor from the generator chamber through an electromagnetic vapor scrubber which further ionizes and separates the refrigerant vapor;

passing the ionized refrigerant vapor from the scrubber to the condenser which transforms the refrigerant vapor to a refrigerant liquid, the refrigerant liquid leaving the condenser at the same pressure but at a lower temperature than upon entering the compressor;

passing the refrigerant liquid through the metering device which reduces the pressure and temperature of the refrigerant liquid;

passing the refrigerant liquid to the evaporator where a heat exchange medium transfers heat to the refrigerant liquid and transforms the liquid to a vapor in order to achieve a desired cooling effect upon the heat exchange medium;

passing the refrigerant vapor from the evaporator to the absorber which increases the concentration of refrigerant in the absorbent of the absorbent/refrigerant fluid; and

recirculating the absorbent/refrigerant fluid to the generator chamber to repeat the cycle.

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**5,490,399**

## REFRIGERATION APPARATUS

**Shinri Sada, Osaka, Japan, assignor to Daikin Industries, Ltd., Osaka, Japan**

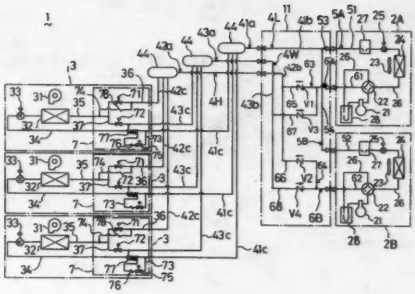
**PCT No. PCT/JP94/00365, § 371 Date Sep. 23, 1994, § 102(e) Date Sep. 23, 1994, PCT Pub. No. WO94/20800, PCT Pub. Date Sep. 15, 1994**

**PCT Filed Mar. 8, 1994, Ser. No. 307,700**

**Claims priority, application Japan, Mar. 8, 1993, 5-046230**

**Int. Cl.**[6] **F25B** *1/10;13/00*

**U.S. Cl. 62—510** **17 Claims**



**1**. A refrigeration apparatus, comprising:

a plurality of thermal source units (**2A**, **2B**) each of which has a compressor (**21**), a thermal-source-side heat exchanger (**24**) which is connected at an end thereof to the discharge side and the inlet side of the compressor (**21**) so as to be switchable between the sides of the compressor (**21**) and connected at the other end to each of liquid lines (**5A**, **5B**), and a thermal-source-side expansion mechanism (**25**) disposed on each of the liquid lines (**5A**, **5B**), and in which base ends of gas lines (**6A**, **6B**) are each connected to the discharge and inlet sides of the compressor (**21**) so as to be switchable between the sides of the compressor (**21**), each of the gas lines (**6A**, **6B**) being branched to a high-pressure passage (**65**, **66**) for allowing a refrigerant to flow in the discharge direction of the compressor (**21**) and a low-pressure passage (**67**, **68**) for allowing a refrigerant to flow in the inlet direction of the compressor (**21**);

a main liquid line (**4L**) connected to the liquid lines (**5A**, **5B**) so that the thermal source units (**2A**, **2B**) are arranged in parallel with one another;

a main high-pressure gas line (**4H**) connected to all the high-pressure passages (**65**, **66**) so that the thermal source units (**2A**, **2B**) are arranged in parallel with one another;

a main low-pressure gas line (**4W**) connected to all the low-pressure passage (**67**, **68**) so that the thermal source units (**2A**, **2B**) are arranged in parallel with one another; and

a plurality of user units (**3**, **3**, . . .) which has a user-side heat exchanger (**32**) connected at an end thereof to the main liquid line (**4L**), a user-side expansion mechanism (**33**) disposed between the user-side heat exchanger (**33**) and the main liquid line (**4L**), and in which the other end of the user-side heat exchanger (**32**) is connected to the main high-pressure gas line (**4H**) and the main low-pressure gas line (**4W**) so as to be switchable between the gas lines (**4H**, **4W**).

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**5,490,400**

## VIBRATION-ISOLATING APPARATUS FOR A CLOTHES WASHING MACHINE AND METHOD OF ASSEMBLY

**Young G. Kim; Woon G. Hur, and Byeong S. Ye, all of Suwon, Rep. of Korea, assignors to Samsung Electronics Co., Ltd., Suwon, Rep. of Korea**

**Filed Dec. 8, 1994, Ser. No. 355,193**

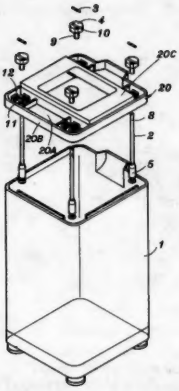
**Claims priority, application Rep. of Korea, Dec. 14, 1993, 93-27684 U**

**Int. Cl.**[6] **D06F** *37/20*

**U.S. Cl. 68—23.3** **5 Claims**

**1**. In a clothes washing machine comprising a cabinet in which a water container is supported at a lower end of a vibration-isolating apparatus that is connected to said cabinet; said apparatus including a cover, vertical suspenders, and fasteners for securing the suspenders to the cover; said cover being mounted on an upper end of said cabinet such that a portion of said cover extends across an upper open end of said cabinet; each of said vertical suspenders having upper and lower ends, said lower ends carrying respective air dampers for absorbing vibrations of said water container during machine operation; said fasteners securing said upper ends of respective suspenders to said cover, the improvement wherein:

holes are formed in said cover through which said upper ends of respective suspenders project upwardly;




caps overlie respective ones of said holes, with said upper ends of said suspenders projecting through respective ones of said caps;

said fasteners comprise fixing pins extending transversely through respective ones of said caps and said upper ends of respective suspenders to secure said suspenders to said cover; and

said cover includes a plurality of stiffener rib structures arranged around each of said holes for reinforcing said cover in the vicinity of said holes, each stiffener rib structure comprising a part extending substantially perpendicularly from said portion of said cover which extends across said upper open end of said cabinet, and a plurality of horizontally spaced ribs projecting from said part and extending toward a respective hole, each rib engaging said portion of said cover.

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**5,490,401**

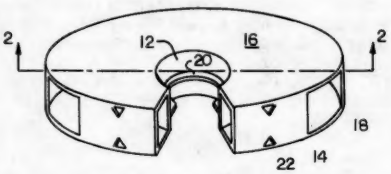
**DYE TUBE SPACER FOR PACKAGE DYEING**

**Gordon A. Wise, Statesville; Roger N. Saunders, Yadkinville; Matthew M. Thomas, Reidsville; Raymond W. Maynard, Advance, and Ronald W. Mangrum, Greensboro, all of N.C., assignors to Unifi, Inc., Greensboro, N.C.**

**Filed Aug. 2, 1994, Ser. No. 284,305**

**Int. Cl.**[6] **D06B** *23/04*

**U.S. Cl. 68—198** **14 Claims**




1. A dye tube spacer, said spacer comprising:

(a) a cylindrical inner wall having an upper edge and a lower edge;

(b) an outer wall spaced from said inner wall and having an upper edge and a lower edge, wherein said outer wall includes drainage openings;

(c) a top annular wall is inclined upwardly from the upper edge of said inner to the upper edge of said outer wall; and

(d) a bottom annular wall extending from the lower edge of said inner wall to the lower edge of said outer wall.

**5,490,402**

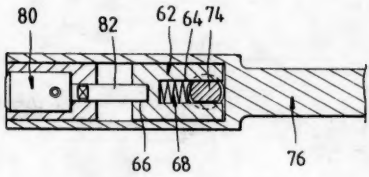
**PADLOCK**

**Jin-Ren Shieh, No. 178, Shih Chia Rd., Taichung, Taiwan, Prov. of China**

**Filed Oct. 22, 1993, Ser. No. 139,731**

**Int. Cl.**[6] **E05B** *67/22*

**U.S. Cl. 70—39** **3 Claims**




1. A padlock comprising:

a lock body having a central portion;

a cross-section through said central portion being uniformly solid through the longitudinal length of said central portion;

a first recess and a second recess respectively located at opposite ends of said central portion;

a shackle having a first arm and a second arm which are parallel to each other;

a first end of said first arm and a second end of said second arm being respectively insertable into said first recess and said second recess into a locking position;

said second end and said second recess having engagement means for engaging the second end to the second recess when in the locking position;

said engagement means preventing said second end from being disengaged from said second recess when in the locking position;

a bolt moveable in said lock body to engage said first end when in the locking position;

a lock bolt control mechanism operated by a key and housed in said lock body;

said lock bolt control mechanism being coupled with said lock bolt to control engagement and disengagement of the lock bolt with the first end when the lock bolt mechanism is turned by the key;

said engagement means permitting the first end to be disengaged from said lock bolt and detached from said first recess before the second end can be disengaged from said second recess;

wherein said lock body has a longitudinal axis;

said lock bolt moving along an axial line of said longitudinal axis between being engaged or disengaged from said first end, said axial line being substantially perpendicular to said first end and second end when in the locking position,

wherein said lock bolt control mechanism comprises

a lock cylinder housing coaxially fixed at an end of said lock body;

a lock cylinder coaxially slidable in said lock cylinder housing;

a locating pin limiting axial movement of said lock cylinder;

a lock cylinder core coaxially fixed to said lock bolt;

said lock cylinder core being engaged to said first end when said key is turned in a first direction and removed from said lock bolt control mechanism;

a restraining pin holding said lock cylinder core in engagement with said first end when said key is removed;

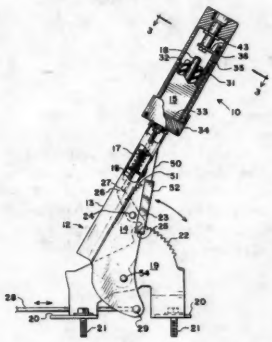
said lock cylinder core being disengaged from said first end when said key is inserted and turned in a second direction in said lock bolt control mechanism,

wherein said lock bolt is provided with a U-shaped end and wherein said first end is formed with an annular waist portion which engages in said U-shaped end when the key is turned in the first direction and the key removed.

## 5,490,403
## HAND BRAKE LEVER LOCK

**Thomas A. Bianco, Sr., 36 Lupine St., Wallingford, Conn. 06492**

**Filed May 10, 1994, Ser. No. 240,242**
**Int. Cl.[6] E05B** *13/00*
**U.S. Cl. 70—202** **2 Claims**



**1**. A locking device adapted to be mounted upon an automobile hand-brake lever housing having an elongated tubular forward portion terminating in an upper, handle extremity having a depressible button adapted to activate a brake-releasing pawl within said housing, said locking device comprising:

a) a tubular inner sleeve having an interior region bounded by a sidewall of square cross-sectional configuration adapted to closely embrace said handle extremity, said inner sleeve having a lower extremity having a surrounding abutment shoulder, an upper extremity having lock engagement means in the form of a slotted aperture positioned within a tab that extends upwardly from the upper extremity of said inner sleeve as a continuous integral extension of the sidewall of said inner sleeve,

b) a tubular outer sleeve having an interior region bounded in part by a sidewall of square cross-sectional configuration adapted to closely embrace said inner sleeve, said outer sleeve having an open lower extremity adapted to contact said abutment shoulder, and a closed upper extremity having a fixedly associated end panel provided with a lock mounting aperture, the length of said outer sleeve, measured between said upper and lower extremities being such that, when slideably emplaced upon said inner sleeve, the lower extremity of said outer sleeve contacts said abutment shoulder, and

c) key-operated lock means fixedly associated with said lock mounting aperture and having a rotatable cam adapted to interlock with said lock engagement means.

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## 5,490,404
## DOOR LOCKING HANDLE ASSEMBLY

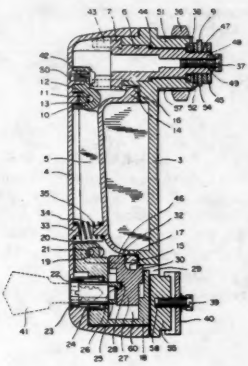
**Kenichi Yamada, Tokyo, Japan, assignor to Takigen Manufacturing Co. Ltd., Tokyo, Japan**

**Filed Jun. 24, 1994, Ser. No. 265,671**
**Claims priority, application Japan, Apr. 11, 1994, 6-098144**
**Int. Cl.[6] E05B** *13/10*
**U.S. Cl. 70—210** **3 Claims**

**1**. A door locking handle assembly, comprising:

a cylindrical bearing portion (**6**) integrally formed with a base-end portion of a base member (**3**) for fixedly mounting on a door (**1**);

a shaft (**7**) which is fixedly mounted in a base-end portion of a handle piece (**4**) and rotatably mounted in said cylindrical bearing portion (**6**) in an insertion manner;



a catch plate (**9**) fixedly mounted in a rear-end portion of said shaft (**7**), said catch plate (**9**) being engageable with and disengageable from a retaining member (**8**) of a stationary frame element (**2**);

a holder (**10**) fixedly mounted on a bottom wall of said base-end portion of said handle piece (**4**);

a first horizontal pin (**11**) inserted in an axial hole (**12**) of said holder (**10**);

a lock lever (**5**) which is mounted in such a way as to pivot about on said horizontal pin (**11**);

a rotation-urging spring (**35**) mounted between a projection (**33**) of a bottom wall of said handle piece (**4**) and a projection (**34**) of a front-end portion of said lock lever (**5**);

a latch casing (**18**) having its base-end portion fixedly mounted in a front-end portion of said handle piece (**4**), said base-end portion of said latch casing (**18**) being provided with an axial hole (**19**);

a second horizontal pin (**21**) inserted in both said axial hole (**19**) and a rotation-restricting oval hole (**20**) formed in a front-end portion of said lock lever (**5**);

a hollow socket portion (**32**) integrally formed with said front-end portion of said lock lever (**5**);

a pair of stopper projections (**14**) and (**15**) which are integrally formed with a base-end portion of said lock lever (**5**) and said front-end portion of said lock lever (**5**), respectively;

a pair of engaging grooves (**16**) and (**17**) for engaging with and disengaging from said stopper projections (**14**) and (**15**) respectively, said engaging grooves (**16**) and (**17**) being integrally formed with said base-end portion of said handle piece (**4**) and said front-end portion of said handle piece (**4**), respectively;

a lock-receiving portion (**22**) integrally formed with said front-end portion of said handle piece (**4**);

a lock unit (**23**) mounted and received in said lock-receiving portion (**22**);

a joint member (**25**) interlocked with a rotor (**24**) of said lock unit (**23**);

a receiving groove (**28**) engaging with an engaging projection (**26**) of said joint member (**25**);

a latch element (**27**) which is interlocked with said joint member (**25**) to move back and forth and received in said latch casing (**18**);

an engaging projection (**30**) formed in a rear-end portion of said latch element (**27**) so as to be engaged with and disengaged from a groove (**29**) formed in said base member (**3**); and

a dead bolt (**46**) formed in a base-end portion of said latch element (**27**) so as to be engaged with and disengaged from said receiving portion (**32**) of said lock lever (**5**);

wherein: said dead bolt (**46**) of said latch element (**27**) is received in said receiving portion (**32**) of said lock lever (**5**) to hold said lock lever (**5**) in its locked position; and, said stopper projections (**14**) and (**15**) of said lock lever (**5**) engage with said engaging grooves (**16**) and (**17**) respectively to

divide torque from said shaft (7) and receive the thus divided torque so that said handle piece (4) is locked to said base member (3).

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**5,490,405**

**CYLINDER LOCK—KEY—COMBINATION**

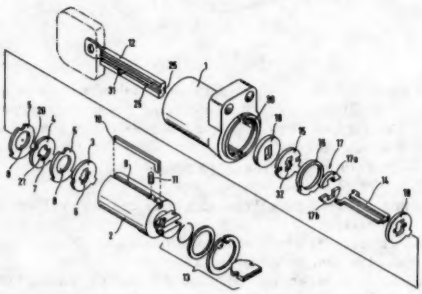
**Seija Rämö; Kyösti Nevalainen, both of Joensuu, and Pekka Vehviläinen, Liperi, all of, Finland, assignors to Abloy Security Ltd Oy, Helsinki, Finland**

**Filed Feb. 25, 1994, Ser. No. 201,659**

**Claims priority, application Finland, Mar. 25, 1993, 931340**

**Int. Cl.[6] E05B** *29/02*

**U.S. Cl. 70—366** **22 Claims**



1. Disc cylinder lock-key-combination, comprising a cylinder housing (1) and inside thereof, a turnable inner cylinder (2) enclosing a stack of discs including a number of locking discs (3,4) provided with peripheral notches (20), a locking bar (10), which in its locking position together with the locking discs (3,4) prevents turning of the inner cylinder (2) with regard to the cylinder housing (1), whereby the locking discs (3,4) are turnable by means of the key (12) of the lock into a releasing position of the lock mechanism, and a guiding element (14) in a key channel formed jointly by key openings (6,7) of the discs (3,4) included in the stack of discs, extending longitudinally over the stack of discs and arranged to turn continuously with the key (12) when the key is turned in the lock, the improvement being therein that the stack of discs includes a number of locking discs (3,4), the key opening (6,7) of which is so formed that it comprises at least one protrusion (21) extending towards the central part of the key opening (6,7) and the adjacent sides of which being substantially perpendicular with regard to each other, whereby one side of the protrusion (21) forms a combination surface (22) arranged to cooperate with a corresponding combination surface (27) in the key (12) for determining the turning movement of the locking disc (3,4) with regard to the inner cylinder (2) when the key (12) is turned in the opening direction of the lock mechanism, and the other side of the protrusion (21) respectively forms a return surface (23) for the locking disc (3,4) on which the key (12) is arranged to act by means of the guiding element (14) for returning the locking disc (3,4) into a locking position of the lock mechanism corresponding to the initial inserting position of the key (12).

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**5,490,406**

**CRIMPING TOOL HAVING DIE BOTTOMING MONITOR**

**David A. College, Annville, Pa., assignor to The Whitaker Corporation, Wilmington, Del.**

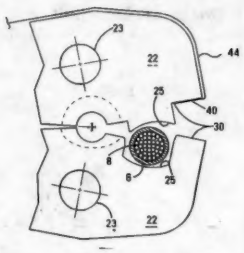
**Filed Aug. 19, 1994, Ser. No. 292,905**

**Int. Cl.[6] H01R** *43/048*

**U.S. Cl. 72—30.1** **17 Claims**

1. A crimping apparatus comprising:

a pair of jaws carrying a mating pair of crimping dies;



means for moving the jaws between an open position wherein the dies are spaced apart, and a closed position wherein the dies are relatively closer together and a pair of stop surfaces on respective ones of the jaws are in abutting relationship, thereby applying a force on one of the stop surfaces; and,

means for verifying that the stop surfaces are in the abutting relationship, including means for generating an electrical signal upon application of the force on the one stop surface.

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**5,490,407**

**METHOD OF AND APPARATUS FOR THE SHAPING OF STAINLESS STEEL MEMBRANES FOR VACUUM-HEAT-INSULATION ELEMENTS**

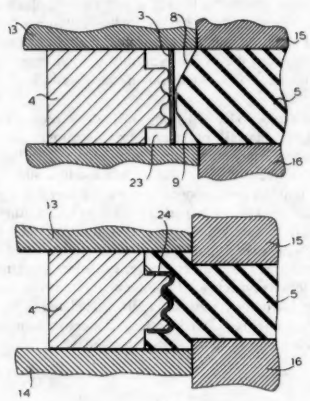
**Ingolf Doose, Stade, Germany, assignor to Umformtechnik Stade GmbH, Stade, Germany**

**Filed Mar. 22, 1994, Ser. No. 216,102**

**Claims priority, application Germany, Mar. 25, 1993, 43 09 678.6**

**Int. Cl.[6] B21D** *27/10*

**U.S. Cl. 72—57** **12 Claims**



1. A press for deforming a stainless steel membrane, comprising:

a base plate dimensioned to absorb pressing force;

a cover plate disposed above said base plate;

means for generating a pressing force applied to said cover plate for displacing said cover plate in a pressing force direction toward said base plate;

a rubber ram juxtaposed with one side of a stainless steel membrane blank between said plates;

means between said plates for compressing said ram in said direction with said pressing force whereby said ram presses said blank in a direction transverse to said pressing force direction to deform said membrane blank;

a forming die between said plates having a lateral configuration complementary to a shape to be imparted to the stainless steel membrane blank, said blank being juxtaposed with said die along a side of said blank opposite said rubber ram;

said means between said plates compressing said ram in said pressing force direction with said pressing force whereby said ram presses said blank against said die in a direction transverse to said pressing force direction to deform said membrane blank into said shape against said die; and

upper and lower die clamping plates between said cover and base plate and clamping said die between the clamping plates upon movement of said cover plate in the pressing force direction.

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**5,490,408**

## METHOD OF AND APPARATUS FOR EXTRUDING A BILLET OF A LIGHT METAL ALLOY

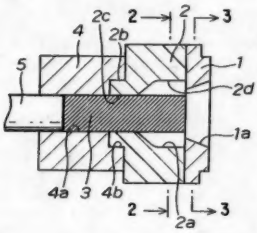
**Shoichi Ando; Yoshihisa Doi, and Makoto Otsubo, all of Saitama, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed Dec. 21, 1994, Ser. No. 360,573**

**Claims priority, application Japan, Dec. 27, 1993, 5-348602**

**Int. Cl.[6] B21C** *23/00;3/00*

**U.S. Cl. 72—256** **18 Claims**




1. A method of extruding a billet of a light metal alloy from a die hole in a die, comprising the steps of preshaping, by use of a pushing stem, a billet having an outer diameter which is smaller than a maximum width of an entry side configuration of the die hole, thereby forming a frontal end portion of the billet into a preshaped portion which is larger than said entry side configuration, near an entry portion of the die hole, and subsequently extruding the preshaped portion by said die hole into an extruded shape.

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**5,490,409**

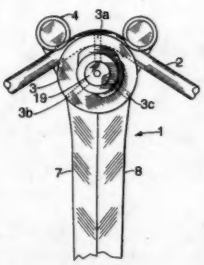
## ADJUSTABLE CAM ACTION ROD BENDER FOR SURGICAL RODS

**Helmut Weber, Emmingen, Germany, assignor to K-Medic, Inc., Northvale, N.J.**

**Filed Nov. 7, 1994, Ser. No. 335,451**

**Int. Cl.[6] B21D** *7/06*

**U.S. Cl. 72—458** **5 Claims**




1. A cam action, adjustable rod bender for bending a surgical rod, comprising two handles bendable about a pivot, said pivot having a rotatable eccentric bending knob mounted on said pivot, said bending knob rotatable to one of a plurality of selected radius bend positions of use, for insertion and bending of a surgical rod within a recess between said rotatable bending knob and a pair of fulcrums, each fulcrum located at a top portion of each of said handles, the rod being bendable by contact of each of said fulcrums against the rod, said fulcrums contacting the rod within said recess against said bending knob, said bending knob rotatable to a plurality of alternate selectable positions of radius bend, said rod bender further including a knee lever, said knee lever holding said bending knob still while said handles are moved, said knee lever including two movable arms joined at a further pivot by a pin, said pin slidably movable within a selected channel of a plurality of channels located on a rear face of a plate, said plate positioned between said two handles and said bending knob against which said plate said bending knob is rotatably movable, to one of said alternate positions of radius bend, said pin slidably movable within each said channel, said bending knob rotatable to a desired locking position against said round plate.

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**5,490,410**

## PROCESS AND A DEVICE FOR MEASURING STATIC AND DYNAMIC FRICTION OF SHEET-SHAPED MATERIALS

**Håkan Markström, Järfälla, Sweden, assignor to AB Lorentzen & Wettre, Kista, Sweden**

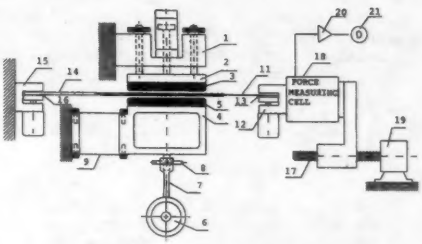
**PCT No. PCT/SE92/00651, § 371 Date Mar. 21, 1994, § 102(e) Date Mar. 21, 1994, PCT Pub. No. WO93/06455, PCT Pub. Date Apr. 1, 1993**

**PCT Filed Sep. 21, 1992, Ser. No. 211,117**

**Claims priority, application Sweden, Sep. 20, 1991, 9102733**

**Int. Cl.[6] G01N** *19/02*

**U.S. Cl. 73—9** **5 Claims**

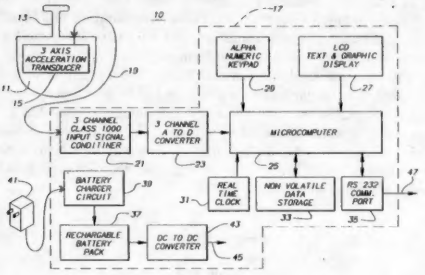



1. A process for measuring friction of paper surfaces against paper surfaces for determining a coefficient of friction between said surfaces, which comprises arranging paper friction testing samples with contacting plane friction test surfaces between two mutually parallel opposite plane load surfaces, exerting with the aid of said load surfaces, an evenly distributed contact force on the friction test surfaces of the paper samples in a direction essentially normal to the friction test surfaces, maintaining a first of said samples and the load surfaces stationary, exerting a friction measuring tensile force on a second of said paper samples, the friction testing surfaces of which are in contact with the friction testing surfaces of said first sample, said tensile force being exerted with movable paper sample clamping means arranged for being moved in a direction of a straight line and for clamping said second paper sample for movement along the straight line which is in a direction of the friction test surfaces when measuring the friction, and measuring the combination of said essentially normal force, exerted with the aid of the load surfaces on the paper friction test surfaces, and said tensile force, which is required for a sliding movement of the friction test surfaces of said clamped second paper friction test sample relative to the contacting paper surfaces of said first paper friction test sample for determining said coefficient of friction.

## 5,490,411
## TESTING DEVICE FOR SURFACES SUBJECT TO IMPACT

**Paul Hogan, 36 Sycamore La., Phoenixville, Pa. 19460**

**Filed Jun. 27, 1994, Ser. No. 266,944**
**Int. Cl.[6] G01N** *3/30*
**U.S. Cl. 73—12.13** **6 Claims**




1. A testing device for surfaces subject to impact, comprising:

a transducer module and an electronics module cooperatively connected together;

said transducer module having an axially aligned handle and a shaped impact head for impact generally in the z-axis of a surface defined by an x and y-axis, said shaped impact head comprising an accelerometer means aligned with each of said axes for producing a voltage output proportional to acceleration in each of said axes upon impact by said impact head on said surface, said accelerometer means having an accelerometer for producing an analog signal proportional to force generated by said impact;

said electronic module having a means for supplying electrical energy to said electronic module, an amplifier, and an analog to digital converter for converting analog signals to conditioned digital signals and computing means for vectorially adding said conditioned signals to determine a peak acceleration of said impact head independent of orientation of impact of said impact head on said surface, said computing means comprising key-pad means for providing input into said computing means and display means for displaying output from said computing means, said computing means adapted to monitor said conditional signals and to collect data upon detection of an acceleration of said impact head above a predetermined value by taking a plurality of acceleration samples of said impact head per second for each axis and saving data for a predetermined period before said conditioned signals exceed a predetermined value to produce a data stream from said impact for use in calculating head injury criteria from said data stream, said computing means being programmed to save data from about one millisecond before said conditioned signals exceed said predetermined value to about 1 millisecond after said conditioned signals return to below said predetermined value to form a drop data collection, and calculating said head injury criteria from said drop data collection.

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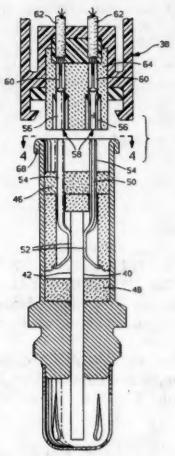
## 5,490,412
## EXHAUST SENSOR WITH REMOVABLE ELECTRICAL CONNECTOR

**Richard W. Duce, Flushing; David B. Quinn, Grand Blanc, and Kathryn M. McCauley, Durand, all of Mich., assignors to General Motors Corporation, Detroit, Mich.**

**Filed May 11, 1993, Ser. No. 59,399**
**Int. Cl.[6] G01N** *30/02*; **G01M** *19/00*
**U.S. Cl. 73—23.31** **6 Claims**



1. An automotive exhaust sensor comprising:

a component requiring electrical power to operate;

a first electrical terminal in electrical contact with said component, said first electrical terminal having a male prong;

a second electrical terminal in electrical contact with a plurality of wires for delivering electrical power from an external source, said second electrical terminal having a female receptacle;

said male prong and female receptacle being constructed and arranged so that at least one of said terminals is selectively removable with respect to the other; and further comprising an upper shield, a shell and a lower shield, and said component being carried by said shell; said first terminal being received in said upper shield and said second terminal being carried by said shell; said upper shield having a resilient locking finger at a lower end and said shell having a ridge at an upper end so that the resilient locking finger of the upper shield is pressure fitted around the ridge of the shell, and so that the first and second terminals are in electrical contact, and said shell having a threaded portion.

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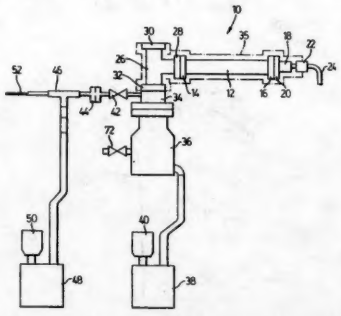
## 5,490,413
## METHOD AND APPARATUS FOR DETECTING REFRIGERANT LEAKS

**John A. Atkinson, 35B George Street, Guelph, Ontario, Canada**

**Continuation of Ser. No. 708,195, May 31, 1991, Pat. No. 5,301,537. This application Jan. 14, 1994, Ser. No. 180,977**
**Int. Cl.[6] G01M** *3/04*
**U.S. Cl. 73—40** **7 Claims**



1. Apparatus for detection of leakage of halogenated hydrocarbon refrigerant gas from a compressor-evaporator-condenser cir-

cuit, comprising: a mass spectrometer having an elongated detector chamber, means for evacuating said detector chamber, an ionizer at one end of said chamber, an ion detector comprising an electron multiplier at an opposite end of said chamber, means for accelerating ions along a path from said ionizer toward said ion detector, and means for separating ions from said path according to mass to charge ratio whereby ions of a predetermined mass range are incident on said ion detector and a signal is generated proportional to the rate of incidence of ions on said detector; and halogenated hydrocarbon gas sample inlet means for said mass spectrometer comprising a flow restricting device connecting said chamber to one end of a tube formed of material substantially non-retentive of halogenated hydrocarbon and having a fine uniform diameter capillary bore such that a 10 feet length thereof has a total internal volume of 0.02 to 0.15 cu. in., an opposite end of the tube connected removably to a sample probe having a bore in communication with said capillary bore, said bore of the sample probe having a porous filter plug therein adapted to retain liquid and particulates and directly intake ambient atmosphere adjacent said compressor-evaporator-condenser circuit.

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**5,490,414**

## METHOD FOR DETECTING LEAKS IN A MOTOR VEHICLE TANK VENTILATION SYSTEM

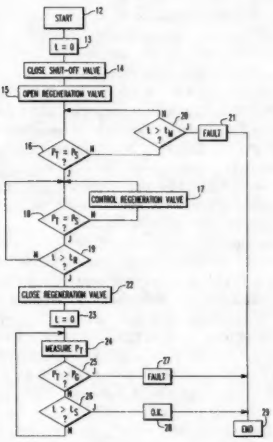
**Ferry Dürschmidt, Friolzheim, and Wolfgang Strauss, Denkendorf, both of, Germany, assignors to Mercedes-Benz AG., Stuttgart, Germany**

**Continuation-in-part of Ser. No. 107,523, Aug. 17, 1993, abandoned. This application Sep. 22, 1994, Ser. No. 310,425**

**Claims priority, application Germany, Aug. 21, 1992, 42 27 698.5**

**Int. Cl.[6] F02M** *33/02*

**U.S. Cl. 73—49.2** **6 Claims**




1. A method for detecting leaks in a motor vehicle tank ventilation system including a fuel tank, an adsorption filter in communication with said fuel tank via a ventilation conduit, a differential pressure sensor arranged in the ventilation conduit, an air supply conduit connecting said adsorption filter with the atmosphere and having a shut-off valve arranged therein, a discharge conduit connecting said adsorption filter to an induction pipe of an internal combustion engine and including a controllable regeneration valve, and a control unit for controlling the valves, said differential pressure sensor being connected to said control unit for relating thereto the pressure sensed in said ventilation conduit, said method comprising the steps of:

closing said shut-off valve so as to isolate said system from the atmosphere, opening and controlling said regeneration valve so as to generate in said system a reduction of the pressure while the air/fuel vapor ratio changes until a predetermined vacuum is generated and to maintain said predetermined vacuum up to a point of time at which a stable equilibrium state of the air/fuel vapor ratio in the system is achieved, then closing said regeneration valve to isolate said system also from said induction pipe, monitoring the vacuum in said system over a predetermined period and indicating the existence of a leak in the tank ventilation system if the vacuum in said system falls below a predetermined threshold value during said predetermined period.

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**5,490,415**

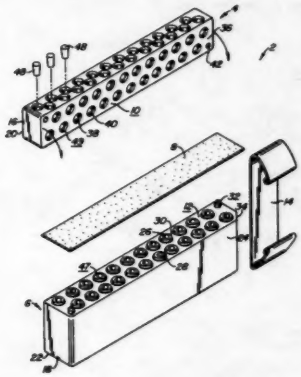
## DIFFUSION TEST APPARATUS AND METHOD

**Vivien H. W. Mak, Menlo Park, and Michael L. Francoeur, Los Altos, both of Calif., assignors to Pharmetrix Corporation, Menlo Park, Calif.**

**Filed Apr. 15, 1994, Ser. No. 227,964**

**Int. Cl.[6] G01N** *13/00*

**U.S. Cl. 73—64.47** **25 Claims**



1. A diffusion test apparatus, for use with a test membrane, comprising:

a receiver assembly including a plurality of receiver receptacles having receiver receptacle openings along a receiving face, the receiver receptacle openings arranged in a chosen pattern;

a donor assembly including a plurality of donor receptacles having donor receptacle openings along a donor face, the donor receptacle openings arranged in a mirror image of said chosen pattern; and

means for securing the donor assembly to the receiver assembly with the test membrane captured between the donor face and the receiver face and the receiver receptacle openings aligned with corresponding ones of the donor receptacle openings;

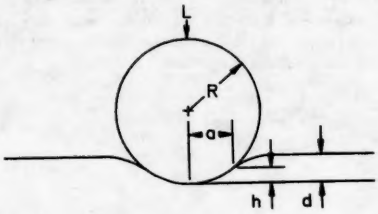
whereby transfer of one or more substances through the membrane can occur.

## 5,490,416

## METHOD OF DETERMINING ELASTIC AND PLASTIC MECHANICAL PROPERTIES OF CERAMIC MATERIALS USING SPHERICAL INDENTERS

Thomas A. Adler, Corvallis, Oreg., assignor to The United States of America as represented by the Secretary of the Interior, Washington, D.C.

Filed Nov. 4, 1994, Ser. No. 336,120
Int. Cl.[6] G01N *3/42*
U.S. Cl. 73—82 20 Claims




1. A process for measuring the plastic and elastic deformation of a hard, brittle material having a strain to failure in a tensile test of about 0.1 or less which comprises:

(a) indenting a hard, brittle material with a rigid, solid, spherical indenter having a sphere radius of at least about 2 micrometers and a hardness of at least about 1/2.5 times the hardness of the brittle material; and

(b) measuring at least one of the contact diameter plastic deformation and contact depth plastic deformation resulting from the indenting; and

(c) calculating $K_2$ and $m_2$ for the spherical indenter; and

(d) calculating $K_1$ and $m_1$ for the brittle material according to at least one of the equations:

$$a=\left[\frac{C_1u}{K_1}+\frac{C_1u}{K_2}+\left[\frac{u}{K_1}\right]^{\frac{1}{m_1}}+\left[\frac{u}{K_2}\right]^{\frac{1}{m_2}}\right]D$$

$$d=\frac{C_2ua}{K_1}+\frac{C_2ua}{K_2}+$$

$$\frac{a}{B_p}\left[\frac{u}{K_1}\right]^{\frac{1}{m_1}}+\frac{a}{B_p}\left[\frac{u}{K_2}\right]^{\frac{1}{m_2}}$$

wherein

$$u=\frac{L}{\pi a^2}$$

$$K_1=\frac{\pi E_1}{(1-\nu_1^2)}$$

$$K_2=\frac{\pi E_2}{(1-\nu_2^2)}$$

$B_p$=1.18028−0.85730 $m_1$+0.17761 $m_1^2$
$C_1$=2.87339+0.19495 $m_1$+0.63433 $m_1^2$
$C_2$=7.02098+0.24729 $m_1$+0.13521 $m_1^2$

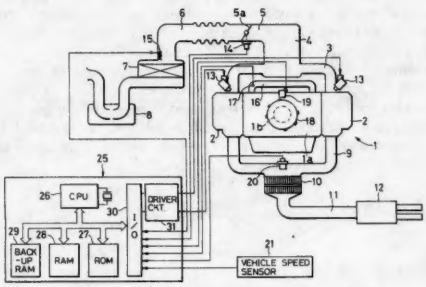
a is the contact radius of the brittle material, $C_1$, and $C_2$ are deflection constants, $B_p$ is the profile shape ratio; $k_1$ is the elastic constant for the brittle material, $k_2$ is the elastic constant for the spherical indenter, u is the mean pressure applied; $K_1$ is the Meyer's law constant for the brittle material, $K_2$ is the Meyer's law constant for the spherical indenter, $m_1$ is the strain hardening exponent for the brittle material, $m_2$ is the strain hardening exponent for the spherical indenter, D is the diameter of the spherical indenter; d is the contact depth; L is the applied load, $E_1$ is the elastic modulus for the brittle material, $E_2$ is the elastic modulus for the spherical indenter, and $\nu_1$ is the Poisson's ratio for the brittle material and $\nu_2$ is the Poisson's ratio for the spherical indenter.

## 5,490,417

## METHOD OF DETERMINING AIR DENSITY FOR INTAKE AIR OF AUTOMOBILE ENGINE

Yoshinori Nakajima, Tokyo, Japan, assignor to Fuji Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 6, 1994, Ser. No. 300,856
Claims priority, application Japan, Sep. 30, 1993, 5-244719
Int. Cl.[6] G01M *15/00*
U.S. Cl. 73—118.2 12 Claims




1. A method of determining the air density of intake air admitted to an operating automotive engine, said engine including an electronically controlled fuel injection system and a throttle valve for adjusting an amount of said intake air, the method comprising:

operating said engine in a vehicle;

detecting a first predetermined operating condition composed of a plurality of engine and vehicle operating conditions;

counting a first detecting time during which said first predetermined operating condition is detected;

detecting a first fuel injection amount each time said first predetermined operating condition is detected and accumulating said first fuel injection amount;

detecting a first throttle opening degree each time said first predetermined operating condition is detected and accumulating said first throttle opening degree;

detecting a second predetermined operating condition composed of a plurality of engine and vehicle operating conditions some or all of which are different from engine and vehicle operating conditions of said first predetermined operating condition;

counting a second detecting time during which said second predetermined operating condition is detected;

detecting a second fuel injection amount each time said second predetermined operating condition is detected and accumulating said second fuel injection amount;

detecting a second throttle opening degree each time said second predetermined operating condition is detected and accumulating said second throttle opening degree;

obtaining a first average fuel injection amount by means of dividing said accumulated first fuel injection amount by said first detecting time when both of said first detecting time and said second detecting time reach a predetermined time;

obtaining a first average fuel throttle opening degree by means of dividing said accumulated first throttle opening degree by said first detecting time when both of said first detecting time and said second detecting time reach a predetermined time;

obtaining a second average fuel injection amount by means of dividing said accumulated second fuel injection amount by said second detecting time when both of said first detecting time and second detecting time reach a predetermined time;

obtaining a second average throttle opening degree by means of dividing said accumulated second throttle opening degree by said second detecting time when both of said first detecting time and second detecting time reach a predetermined time;

calculating a first parameter which is a ratio of said first average fuel injection amount versus said first average throttle opening angle;

calculating a second parameter which is a ratio of said second average fuel injection amount versus said second average throttle opening angle;

calculating a third parameter which is a ratio of said first average fuel injection amount versus said second average throttle opening angle;

calculating a fourth parameter which is a ratio of said second average fuel injection amount versus said first average throttle opening angle;

calculating a determination parameter which is a weighted mean of said first parameter, said second parameter, said third parameter and said fourth parameter by multiplying an appropriate weight factor to each of said first, second, third and fourth parameters respectively; and

determining air density of induction air by referring to a map parameterizing said air density and said determination parameter and controlling the amount of fuel injection based on said air density by changing the amount of fuel injection according to said air density.

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**5,490,418**

## DEVICE FOR MEASURING THE FORCE EXERTED BY A GRID SPRING

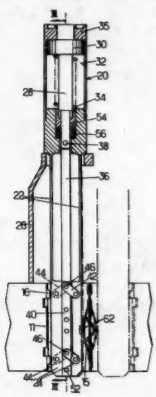
**Claude Rebours, Goux-les-Usiers, and Gerard Barbe, Rueil Malmaison, both of, France, assignors to Société Franco-Belge de Fabrication de Combustibles, Paris la Defense, France**

**Filed Nov. 10, 1994, Ser. No. 338,801**

**Claims priority, application France, Nov. 12, 1993, 93 13512**

**Int. Cl.[6] G21C** *17/00*

**U.S. Cl. 73—161** **8 Claims**




1. A device for measuring a force which would be exerted by a spring of a supporting grid on a fuel rod of set diameter passing through the grid, comprising:

an elongate body; a pair of flexible blades parallel to the direction of elongation and connecting the body to a pair of respective beams insertable in a cell, a force sensor connected to at least one of the beams for contact against the spring; a unit slidable in and along the body between a position in which it moves the beams apart while keeping them parallel to give them a spacing that corresponds to said set diameter, and a position in which it allows the flexible blades to move the beams towards each other; and means moving said movable unit at will between said two positions.

**5,490,419**

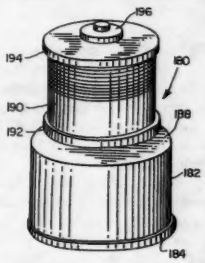
## SECONDARY CONTAINMENT SYSTEM USING FLEXIBLE PIPING

**Michael C. Webb, Exton, Pa., assignor to Total Containment, Inc., Oaks, Pa.**

**Continuation of Ser. No. 7,906, Jan. 22, 1993, Pat. No. 5,333,490, which is a continuation of Ser. No. 921,377, Jul. 30, 1992, abandoned, which is a continuation of Ser. No. 713,984, Jun. 12, 1991, abandoned, which is a continuation of Ser. No. 611,435, Nov. 13, 1990, Pat. No. 5,060,509, which is a continuation of Ser. No. 348,396, May 8, 1989, Pat. No. 5,040,408, which is a division of Ser. No. 254,021, Oct. 6, 1988, abandoned, which is a continuation-in-part of Ser. No. 103,206, Oct. 1, 1987, Pat. No. 4,805,444. This application Jul. 27, 1994, Ser. No. 281,112**

**Int. Cl.[6] B65D** *90/10;90/48*

**U.S. Cl. 73—40.5 R** **11 Claims**




1. A sump-riser apparatus for a pipeline system, said apparatus comprising:

a) a hollow collection sump base for collecting fuel leaking from a pipeline system, said sump base having upper and lower portions and at least one wall extending between said upper and lower portions, said sump base having at least a first diameter;

b) a riser extension mounted on said sump base, said riser extension having upper and lower portions;

c) said riser extension having a step portion disposed adjacent said lower portion of said riser extension, said step portion including an outwardly extending wall and a generally vertically extending wall; said riser extension immediately above said outwardly extending wall having a first diameter, said first diameter of said riser extension being less than said first diameter of said sump base; said outwardly extending wall being disposed directly adjacent said upper portion of said base; and

d) a cover mounted on said riser extension, said cover having a diameter greater than said first diameter of said riser extension.

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**5,490,420**

## GYROSCOPIC DEVICES

**James S. Burdess, Whitley Bay, England, assignor to British Technology Group Ltd., London, England**

**PCT No. PCT/GB92/00930, § 371 Date May 6, 1994, § 102(e) Date May 6, 1994, PCT Pub. No. WO92/21000, PCT Pub. Date Nov. 26, 1992**

**PCT Filed May 22, 1992, Ser. No. 142,357**

**Claims priority, application United Kingdom, May 24, 1991, 9111316**

**Int. Cl.[6] G01P** *9/04*

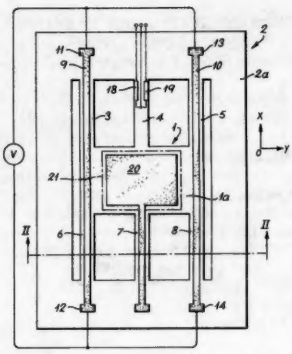
**U.S. Cl. 73—504.02** **9 Claims**

1. A gyroscopic device comprising:

at least one mass having a first flat surface;

a supporting structure having a second flat surface and encompassing said at least one mass;

a plurality of beams attaching said at least one mass to said supporting structure, said plurality of beams lying within a



common plane when said device is at rest, each of said plurality of beams being of elongated shape in a lengthwise direction, said plurality of beams being disposed about said at least one mass such that said first flat surface of said at least one mass is maintained parallel to said common plane and parallel to said second flat surface of said supporting structure at all times; and

electromotive power generating means within the gyroscopic device for generating electromotive forces between said at least one mass and said supporting structure to excite said at least one mass into a vibratory primary motion, said primary motion of said at least one mass flexing said plurality of beams in a manner including torsionless bending in said lengthwise direction permitting said it least one mass to make a limited secondary motion in response to a rate of turn of said device, a measure of said rate of turn being obtained from sensing a relative movement between said at least one mass and said supporting structure.

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**5,490,421**

**SEMI-CONDUCTOR ACCELERATION SENSOR HAVING THIN BEAM SUPPORTED WEIGHT**

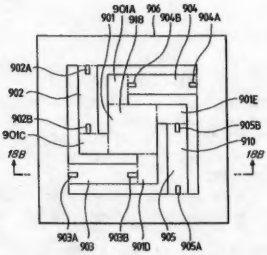
**Katsumichi Ueyanagi, Kanagawa, Japan, assignor to Fuji Electric Co., Ltd., Kanagawa, and Fujitsu Ten Limited, Hyogo, both of, Japan**

**Continuation of Ser. No. 36,697, Mar. 25, 1993, abandoned. This application Jan. 23, 1995, Ser. No. 376,051**

**Claims priority, application Japan, Mar. 25, 1992, 4-66470; Aug. 27, 1992, 4-227651**

**Int. Cl.[6] G01P** *15/12*

**U.S. Cl. 73—514.33** **24 Claims**



**1**. A semiconductor acceleration sensor comprising:

a thick weight made of a semiconductor;

a thick support member separated by a predetermined gap from said thick weight and surrounding said thick weight; first and second pairs of thin beams, separated from each other by an angle of 90 degrees about the center of said thick weight, which connect the outer periphery of said weight with the inner periphery of said support member, one beam of each of said first and second pairs of thin beams coinciding with the other beam of each of said first and second pairs of thin beams when said one beam is rotated by 180 degrees about the center of said thick weight; and

strain gauge means formed on upper faces of said first and second pairs of beams, for measuring a force applied to said thick weight, comprising first type strain gauges and second type strain gauges, said first type strain gauges and said second type strain gauges having different output characteristics in response to the force applied to said thick weight,

said first type strain gauges being respectively formed on the upper faces of said first and second pairs of beams on a portion of each beam of said pairs near the connection thereof to said support member and in the longitudinal direction of the respective beam, and said second type strain gauges being respectively formed on the upper faces of said first and second pairs of beams on a portion of each beam of said pairs near the connection thereof to said support member and in the width direction of the respective beam,

wherein said thick weight, said support member and said beams are formed from one semiconductor substrate, and working widths of engraved portions for forming said weight, said support member and said beams are identical with each other, said engraved portions being engraved from the upper and lower faces of said semiconductor substrate.

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**5,490,422**

**ACCELERATION SENSOR**

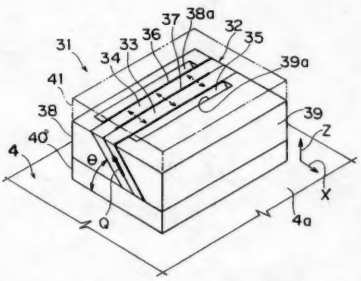
**Jun Tabota; Jiro Inoue, and Toshihiko Unami, all of Nagaokakyo, Japan, assignors to Murata Manufacturing Co., Ltd., Japan**

**Filed Mar. 18, 1994, Ser. No. 210,370**

**Claims priority, application Japan, Mar. 19, 1993, 5-060144; Mar. 19, 1993, 5-060145; Jul. 2, 1993, 5-164577; Jul. 13, 1993, 5-173018; Feb. 21, 1994, 6-022454**

**Int. Cl.[6] G01P** *15/08;3/22*

**U.S. Cl. 73—514.34** **14 Claims**



**1**. An acceleration sensor comprising:

an acceleration sensor body formed of a bimorph piezoelectric ceramic element and having a specific insensitive direction along which no acceleration is detectable; and

a case supporting said sensor body as a center beam and having a mounting surface to be mounted on an external device,

said sensor body being so supported by said case that said insensitive direction is along a direction being neither parallel nor perpendicular to said mounting surface of said case.

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**5,490,423**

**Patent Not Issued For This Number**

**5,490,424**

## PRESSURE SENSOR WITH MOISTURE RESISTANCE AND UNIFORM CHARACTERISTICS

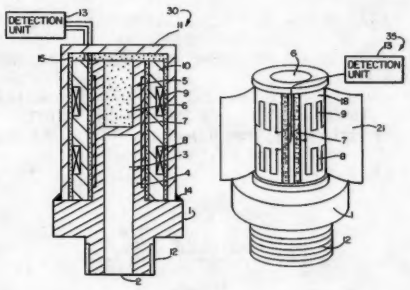
**Rihito Shoji, Yawata, and Shinji Saitou, Suita, both of, Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan**

**Filed Mar. 4, 1994, Ser. No. 206,505**

**Claims priority, application Japan, Mar. 9, 1993, 5-047703; Mar. 15, 1993, 5-054190**

**Int. Cl.[6] G01L** *9/10;7/04*

**U.S. Cl. 73—728** **18 Claims**




**1**. A pressure sensor, comprising:

a main body including a pressure inlet at an end thereof, a deformable section deformed by a pressure introduced through the pressure inlet, and a non-deformable section maintaining a shape thereof even when supplied with a pressure introduced through the pressure inlet;

an amorphous magnetic alloy member having a magnetostriction constant, the amorphous magnetic alloy member being adhered on the deformable section and the non-deformable section;

a first permeability detection element for detecting the permeability of a part of the amorphous magnetic alloy member corresponding to the deformable section;

a second permeability detection element for detecting the permeability of another part of the amorphous magnetic alloy member corresponding to the non-deformable section; and

a yoke for covering the first and the second permeability detection elements, wherein the yoke is adhered on the main body to form a substantially moisture proof seal,

wherein the amorphous magnetic alloy member and the first and the second permeability detection elements are included in a magnetic circuit, and pressure detection is performed based on the difference between the permeability detected by the first permeability detection element and the permeability detected by the second permeability detection element, the difference being caused by application of pressure.

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**5,490,425**

## FERROFLUID PRESSURE SENSOR AND WARNING DEVICE

**Kuldip Raj, Merrimac, N.H.; James Torres, Methuen, Mass., and Susan Lanphear, Nashua, N.H., assignors to Ferrofluidics Corporation, Nashua, N.H.**

**Filed Mar. 14, 1994, Ser. No. 212,272**

**Int. Cl.[6] G01L** *9/00*

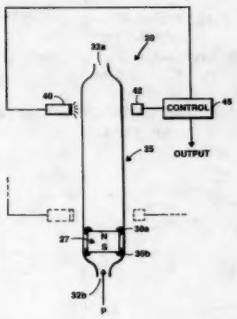
**U.S. Cl. 73—745** **12 Claims**

**1**. A ferrofluid pressure sensor comprising:

a. a nonmagnetic housing having an interior dimension, all interior wall and two ends;

b. means forming an aperture in at least one end of the housing;

c. a solid magnet having a longitudinal axis and disposed within the housing, the magnet having a transverse dimension smaller than the interior dimension of the housing;




d. at least one band of ferrofluid surrounding the magnet and in contact with the interior wall of the housing; and

e. means for sensing displacement of the magnet from a rest position.

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**5,490,426**

## METHOD FOR DETECTING STRESSES

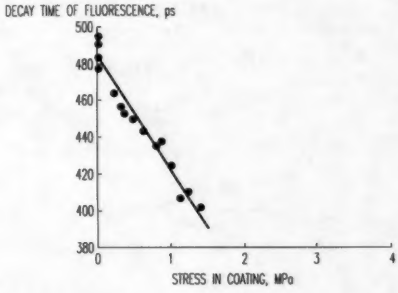
**Tohru Shiga, Okazaki; Akane Okada, Obu; Hideroh Takahashi, Aichi, and Toshio Kurauchi, Nagoya, all of, Japan, assignors to Kabushiki Kaisha Toyota Chuo Kenkyusho, Aichi, Japan**

**Filed Mar. 17, 1995, Ser. No. 405,960**

**Claims priority, application Japan, Mar. 18, 1994, 6-049067; Feb. 14, 1995, 7-025725**

**Int. Cl.[6] G01L** *1/00*

**U.S. Cl. 73—762** **15 Claims**




**1**. A method for detecting stresses, comprising the steps of:

dispersing a fluorescent substance in a solid portion of an object where stresses are to be detected;

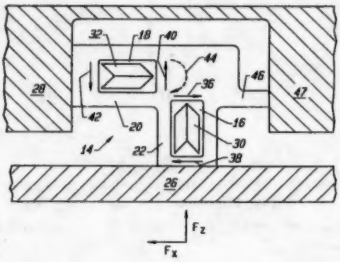
measuring fluorescence decay times exhibited by said dispersed fluorescent substance; and

detecting stresses in said solid portion based on the measured fluorescence decay times.

## 5,490,427
## SIX AXIS FORCE SENSOR EMPLOYING MULTIPLE SHEAR STRAIN GAGES

**Albert G. Yee, Fremont, Calif., and Hadi A. Akeel, Rochester Hills, Mich., assignors to Fanuc USA Corporation, Elkgrove Village, Ill.**

**Filed Oct. 17, 1994, Ser. No. 324,414**
**Int. Cl.[6] G01L** *5/16*
**U.S. Cl. 73—767** **25 Claims**




1. A force sensor for measuring forces interacting between bodies connected to opposite sides of the force sensor, on a sensor body structure in at least two dimensions, the force sensor comprising:

an L-shaped leg integrated in the sensor body and having a first arm and a second arm each having a direction substantially perpendicular to that of the other arm, each arm also having a generally planar surface;

a first shear strain gage mounted on the first arm of the L-shaped leg such that the first strain gage primarily measures shear forces which are both parallel to the plane of the first arm and perpendicular to the direction of the first arm;

a second shear strain gage mounted to the second arm of the L-shaped leg such that the second strain gage primarily measures shear forces which are both parallel to the plane of the second arm and perpendicular to the direction of the second arm.

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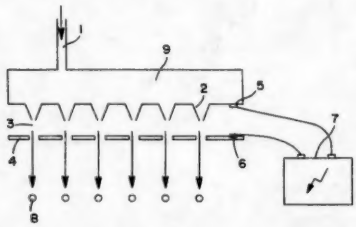
## 5,490,428
## METERING OF LIQUID SUBSTANCES

**Dieter Dürr, Starnberg, Germany, assignor to Linde Aktiengesellschaft, Wiesbaden, Germany**

**Filed Aug. 30, 1993, Ser. No. 113,137**
**Claims priority, application Germany, Aug. 31, 1992, 42 29 005.8**
**Int. Cl.[6] G01F** *13/00;* **B65D** *47/18*
**U.S. Cl. 73—861.41** **9 Claims**




1. A process for metering a liquid substance comprising:

forcing a liquid substance, with separation into drops, through at least one discharge orifice made of electrically conductive material by application of a constant externally supplied pressure force;

generating an electrical field in the zone of said at least one discharge orifice by applying electrical voltage to the at least one discharge orifice and to a counterelectrode spaced therefrom whereby said drops are subjected to said electrical field; and

measuring the amount of liquid dispensed by counting the number of drops,

wherein the size of each of said drops is regulated by the amount of voltage applied to generate said electrical field in the zone of said at least one discharge orifice.

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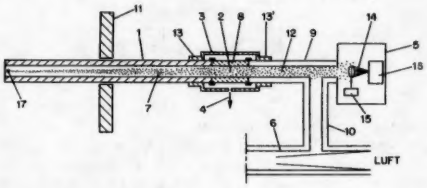
## 5,490,429
## APPARATUS FOR SAMPLING GAS FROM A HOT DUST-FILLED GAS STREAM

**Gyula Jarolics, Valby, Denmark, assignor to FLS Automation A/S, Denmark**

**Division of Ser. No. 101,383, Jul. 19, 1993, Pat. No. 5,413,001. This application Feb. 9, 1995, Ser. No. 385,802**
**Claims priority, application Denmark, Jul. 21, 1992, 936/92**
**Int. Cl.[6] G01N** *1/14*
**U.S. Cl. 73—863.83** **7 Claims**




1. A gas sampling probe for sampling gas from a hot dust-filled gas stream wherein the probe has an end facing away from the gas-filled atmosphere which is connected to a gas pump for establishing a gas flow through the probe, said probe being provided with a separate gas sampling outlet for samplings a portion of the gas, the sample being fed from the probe to an analysis apparatus for further examination, and wherein the probe comprises three successively connected pipe sections of a heat-resistant material, a first pipe section comprising a gas inlet section, a second pipe section comprising a filter section having pipe walls of a ceramic porous material, and a third pipe section comprising a gas outlet section to which the gas pump is connected by means of a conduit, and wherein the second pipe section along the entire pipe periphery is surrounded by a filter housing which at both ends is connected in a gas-proof manner to the exterior of the adjacent ends of the first section and of the third section, respectively, to which filter housing the gas sampling outlet is connected, characterized in that the probe is provided with a device for activating the dust inside the internal probe area, said device comprising at least one of a laser emitter or means for deionization of the dust particles prior to filtration of the sample in the probe.

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## 5,490,430
## OPTICAL TORQUE SENSOR UTILIZING CHANGE IN REFLECTANCE GRATING LINE SPACING

**Philip M. Anderson, 37 Winding Way, Madison, N.J. 07940, and John W. Curran, 11 Robert Dr., Lebonan, N.J. 08833**

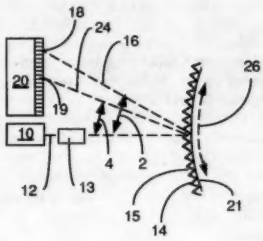
**Continuation-in-part of Ser. No. 882,948, May 14, 1992, abandoned. This application Aug. 27, 1993, Ser. No. 112,375**
**Int. Cl.[6] G01L** *3/00*
**U.S. Cl. 73—862.324** **11 Claims**

1. An apparatus for measuring torque on a rotating or stationary shaft under torsion, comprising:

(a) a light source for emitting a light along a light path;

(b) a light detector having a plurality of light detecting elements; and

(c) a reflection grating provided with grating lines and grating spacing, said reflection grating being fixed to said shaft along said light path and said grating lines being fixed at an angle of




45° to the length of said shaft, for diffracting said light onto said light detecting elements in an alternating pattern of minima and maxima,

whereby said torque causes a change in said grating spacing, said change causes different light detecting elements of said light detector to receive said alternating pattern.

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**5,490,431**

## MAGNETIC TORSION METER FOR MEASURING TORQUES

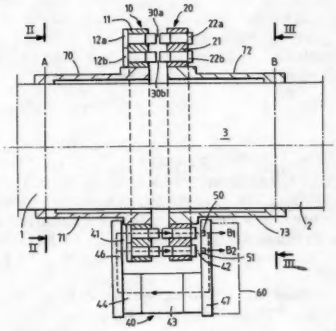
**Gerard M. O'Mahony, 95 rue de Versailles, 92410 Ville D'Avray, and Lucien P. Slama, 4 Rue Mayran, 75009 Paris, both of, France**

**Filed Feb. 7, 1995, Ser. No. 385,308**

**Claims priority, application France, Feb. 8, 1994, 94 01371**

**Int. Cl.[6] G01L** *3/02*

**U.S. Cl. 73—862.331** **17 Claims**




1. A magnetic torsion meter for measuring torque exerted on a rotating assembly, the magnetic torsion meter comprising:

first and second rotors respectively connected to a first and a second section of a rotating shaft, said first and second rotors each comprising an annular disk made of nonmagnetic material and two concentric coils of ferromagnetic pins, pins of said first rotor facing pins of the second rotor, while defining two measuring gaps;

an exterior magnetic circuit including two gaps;

a continuous magnetic source of excitation bounded by said exterior magnetic circuit and creating a magnetic flux;

at least two magnetic induction sensors housed in one of said gaps of said magnetic circuit measuring magnetic flux; and

a treatment circuit connected to said sensors, said treatment circuit producing an electric output signal proportional to the torque exerted on the rotating assembly.

**5,490,432**

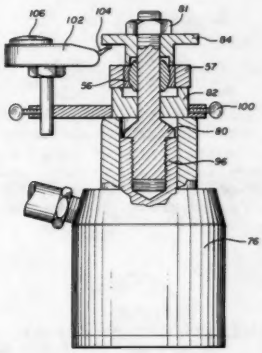
## KIT FOR OPERATING UPON BEARINGS

**Larry D. Allard; Richard K. Granowski, both of Owatonna, Minn., and Thomas J. Neesley, Chatsworth, Calif., assignors to Kahr Bearing, a Dover Diversified Company, Tuscon, Ariz.**

**Continuation of Ser. No. 893,767, Jun. 5, 1992, abandoned. This application Jan. 5, 1994, Ser. No. 177,555**

**Int. Cl.[6] G01M** *13/04*

**U.S. Cl. 73—865.9** **12 Claims**




1. In combination for proof testing a swaged bearing,

a press,

a receiver die,

a driver die spaced from the receiver die for holding the swaged bearing between the receiver die and the driver die,

a pull rod shaft extending from the press through the receiver die, the swaged bearing and the driver die for supporting the receiver die, the swaged bearing and the driver die,

first means disposed on the pull rod shaft and against the driver die for adjustably positioning the driver die against the swaged bearing,

an indicator having a dial and a pointer,

second means supported on the press for holding the indicator, and

third means extending between the indicator and the receiver die for imposing a force on the indicator in accordance with the adjustable positioning of the driver die to indicate the effectiveness of the swage in the bearing by such adjustments in the positioning of the driver die.

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**5,490,433**

## SEMI-CONTINUOUS TRANSMISSION

**Craig L. Althen, 5533 S. Golfcourse Dr., Morrison, Colo. 80465**

**Filed Jan. 23, 1995, Ser. No. 377,284**

**Int. Cl.[6] F16H** *3/22*

**U.S. Cl. 74—348** **11 Claims**

1. A variable speed mechanism comprised of

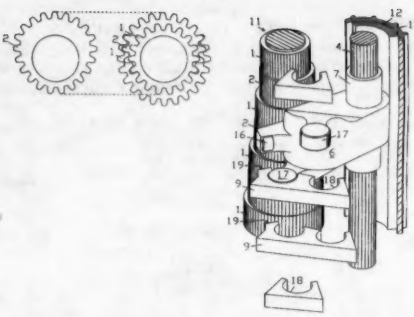
a primary rotatable shaft having a plurality of substantially coatiguous gears of varying diameters with helical cut teeth;

said contiguous gears being comprised of a plurality of circular gears of varying diameters separated by, and alternating with, a plurality of ramp gears;

said ramp gears being eccentrically disposed and comprised of circular sectors on diametrically opposite sides matching equivalent sectors of said adjacent pairs of circular gears;

said diametrically opposed sectors being joined by sectors of progressive and continuously changing radius thus forming a complete and bilaterally symmetrical gear providing continuous helical tracks between said pairs of circular gears;

at least one mating gear with compatible helical cut teeth mounted on a parallel shaft;



said parallel shaft having means of radial movement relative to the fixed centerline of the primary rotatable shaft;

said mating gear having means to longitudinally slide between all pairs of said circular gears by following said continuous helical track across said ramp gears when said sliding action is timed in coordination with the rotation of said ramp gears.

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**5,490,434**

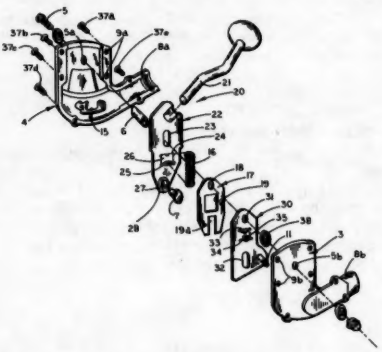
**VEHICLE TRANSFER CASE SHIFTER SYSTEM**

**Charles Osborn, Spring Lake, and Robert M. Medema, Muskegon, both of Mich., assignors to Grand Haven Stamped Products, Grand Haven, Mich.**

**Filed Jan. 28, 1994, Ser. No. 188,561**

**Int. Cl.[6] B60K** *23/08*

**U.S. Cl. 74—475** **16 Claims**



1. A transfer case shifter mechanism comprising a shift lever and a detent means having a detent groove located therein, said detent groove having a plurality of notches including at least a first notch and a second notch, each notch representing a different shifter position, said notches adapted for separately receiving a detent pin;

said shift lever including a first lever plate having a handle extending from its upper end;

a detent pin connected to the lower end of said first lever plate and extending transversely thereof into said detent groove;

a shift lever plate pivotable at its upper end about a pivot member located on an axis fixed with respect to said detent groove and having connecting means for connection to means for transmitting the pivotal movement of said shift lever plate to the gears of a transfer case;

said first lever plate being mounted for vertical sliding movement relative to said shift lever plate by means of a slot at its upper end for receiving said pivot member;

a spring directly connected to said first lever plate and biasing said first lever plate upwardly relative to said shift lever plate; and

coupling means at the lower ends of said first lever plate and shift lever plate for providing simultaneous pivotal movement of said handle, said first lever plate with said detent pin and said shift lever plate about said axis whereby said detent pin can be moved from said first notch representing one of said shifter positions to said second notch representing another of said shifter positions upon applying a downward force on said handle against the bias of said spring to move said detent pin out of said first notch, applying a pivoting force to said handle to align said detent pin with said second notch, and releasing said downward force permitting said detent pin to enter said second notch.

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**5,490,435**

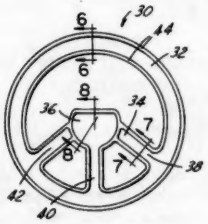
**ENERGY ABSORBING STEERING WHEEL**

**Babak R. Famili, Troy, Mich., assignor to Chrysler Corporation, Highland Park, Mich.**

**Filed Aug. 25, 1994, Ser. No. 295,561**

**Int. Cl.[6] B62D** *1/04*

**U.S. Cl. 74—552** **20 Claims**



1. A vehicle steering wheel comprising a one piece aluminum structure having rim, spoke and hub portions arranged in the same plane and each having continuous downwardly extending flanges from said plane which enables said rim, spoke and hub portions to collapse simultaneously at the same load upon impact by the body of a vehicle operator during a vehicle impact.

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**5,490,436**

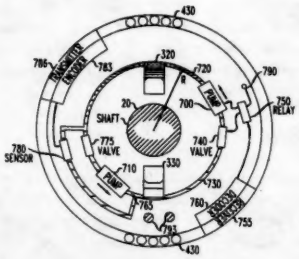
**LIQUID-CHAMBER APPARATUS FOR ACTIVE, DYNAMIC BALANCING OF ROTATING MACHINERY**

**James C. Coyne, New Providence; Richard T. LaGrotta, West Orange; Frank A. Magnotti, and Frances Turbiak-Magnotti, both of Millburn, all of N.J., assignors to AT&T Corp., Murray Hill, N.J.**

**Filed Mar. 17, 1994, Ser. No. 214,728**

**Int. Cl.[6] G05G** *1/00;* **F16F** *15/22;15/10*

**U.S. Cl. 74—573 F** **10 Claims**



1. Apparatus for balancing a rotating machine, said machine having a rotational axis and further having a rotatable shaft concentric with the axis, the apparatus comprising:

a) means for sensing rotational imbalance of the machine during rotation of the shaft;

b) a signal processor for generating a control signal responsive to the sensing means, said processor physically separated from the shaft such that said processor does not co-rotate therewith;

c) a body adapted to mount on the shaft and to co-rotate therewith;

d) means, stationary relative to the signal processor, for transmitting the control signal;

e) means, stationary relative to the body, for receiving the control signal;

f) a first interconnectable group comprising at least first and second chambers formed within the body and having respective centroids disposed substantially at equal angular intervals around the rotational axis, wherein each of said chambers is adapted to contain a first inertial liquid, each of said chambers has a longitudinal axis oriented in a substantially radial direction relative to the rotational axis, each of said chambers has an outer end disposed distal the rotational axis, and each of said outer ends has a respective maximum radial distance from the rotational axis, said maximum distance to be referred to as the respective chamber outer radius;

g) at least one first channel adapted for transferring at least a portion of said first inertial liquid between the chambers of the first interconnectable group, said channel disposed within the body and radially distant from the rotational axis by at least the greatest of the respective chamber outer radii; and

h) first motive means, mounted within the body, for impelling at least a portion of said first inertial liquid through the first channel in response to the control signal received by the receiving means, wherein:

i) the first interconnectable group of chambers, the first channel, and the first motive means form a first sealable system with respect to said first inertial liquid;

j) each of the chambers is adapted such that under the action of centrifugal force, said first inertial liquid within the chamber is urged toward the outer end of that chamber, and

k) the first channel is in receiving relationship to the chambers with respect to displacements of said first inertial fluid induced by centrifugal force.

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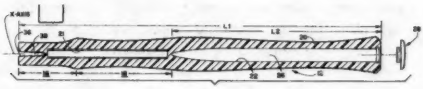
**5,490,437**

## HAMMER

**Paul W. Hebert, 6450 Lakeshore Dr., San Diego, Calif. 92119; Ted Floyd, 453 Grand Ave., Spring Valley, Calif. 91977; Larry C. Rogers, 9890 Cook Ave., Riverside, Calif. 92503, and Dorothy L. Howe, 1112 Buena Vista, Spring Valley, Calif. 91977**

**Filed Aug. 25, 1994, Ser. No. 295,934**
**Int. Cl.[6] B25D** *1/00;1/10*
**U.S. Cl. 81—22** **11 Claims**



**1**. A hammer comprising:

an elongated handle having a longitudinally extending axis and a predetermined length **L1**; said handle having in sequence a front end, a head attachment portion, a neck portion, a main body portion, and a rear end;

said main body portion having a bore hole extending longitudinally inwardly from its rear end; said bore hole having a length **L2** and **L2** is in the range of 0.25–0.80 **L1**;

said bore hole being filled with a gelatinous material having shock dissipation properties; and

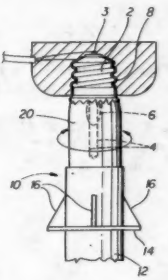
an end cap secured to the rear end of said handle for sealing said bore hole.

**5,490,438**

## TOOL FOR REMOVING BROKEN LIGHT BULBS

**Alan L. Zupo, Markham, and Roger G. Brown, Willowdale, both of, Canada, assignors to Socket Butler Inc., Concord, Canada**

**Filed Dec. 7, 1994, Ser. No. 350,857**
**Int. Cl.[6] H01K** *3/32*
**U.S. Cl. 81—53.11** **19 Claims**



**1**. A tool for removing a broken incandescent light bulb from a socket, comprising

a handle having a head projecting from one end, the head being dimensioned to fit within the base of the light bulb,

a resilient gripping member formed from a resilient plastic dimensioned to snugly enshroud the head of the tool,

whereby when the head is inserted into the base of a broken light bulb the gripping member frictionally engages an inner wall of the base to permit rotation of the base within the socket by rotating the handle.

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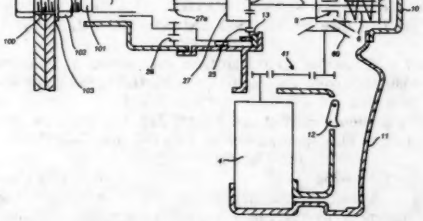
**5,490,439**

## NUT TIGHTENING DEVICE

**Shozo Matsumura, Toyonaka, and Sueharu Yasutomi, Osaka, both of, Japan, assignors to Maeda Metal Industries, Ltd., Japan**

**Filed Nov. 8, 1994, Ser. No. 336,822**
**Claims priority, application Japan, Nov. 11, 1993, 5-060751**
**Int. Cl.[6] B25B** *21/00;23/151*
**U.S. Cl. 81—469** **7 Claims**



**1**. A nut tightening device for use in tightening a nut as screwed on a shear bolt having a tip to be sheared, the device comprising a planetary gear reduction mechanism accommodated within a housing, an outer socket engageable with the nut and coupled to an internal gear of the reduction mechanism, an inner socket engageable with the bolt tip and coupled to a planetary gear support frame of the reduction mechanism, a friction ring provided between the support frame and the housing for holding the support frame slippably in frictional engagement with the housing, and a rotation

source attached to the housing for inputting power to the reduction mechanism within the housing through a torque detecting control mechanism, the torque detecting control mechanism being operable to detect a nut tightening force and discontinue supply of the power from the rotation source upon the tightening force reaching a predetermined value.

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**5,490,440**

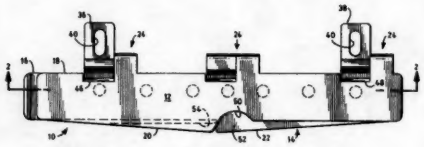
**PAPER PUNCH**

**Robert G. Karlis, Hingham, and David S. Blumenthal, Newton Center, both of Mass., assignors to Clix Products, Inc., Natick, Mass.**

**Continuation-in-part of Ser. No. 61,427, May 6, 1993, Pat. No. 5,291,813. This application Dec. 7, 1993, Ser. No. 163,833**

**Int. Cl.[6] B26F** *1/32*

**U.S. Cl. 83—599** **12 Claims**



**6**. Paper punch comprising:

(a) a top punch plate and a bottom die plate, each formed of a substantially rigid, hard polymeric material;

(b) each of said plates having opposed flat surfaces and bounded along its axial length by a straight edge and a contoured edge;

(c) hinge means for removably securing said plates to one another along their said respective straight edges about a pivot point located below said flat surface of said bottom die plate and in two positions: a first position with said plates being in parallel spaced relation to one another, and a second position with said plates being in open relation to one another, defining an obtuse angle between said plates;

(d) said hinge means comprising male members formed on said bottom die plate and corresponding female members formed on said top punch plate, one of said male members formed with a pair of resilient bifurcated elements designed for axial deflection upon engaging its said corresponding female member.

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**5,490,441**

**AUTOMATIC RECIPROCATION OF A REVERSIBLE FLUID PRESSURE UNIT AND SWITCHING VALVE THEREFOR**

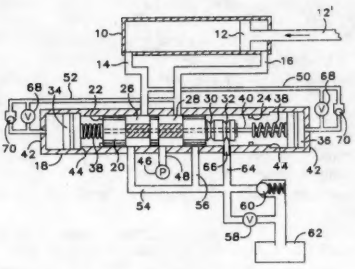
**Olof A. Hallstrom, 1920 Hallstrom Rd.; Steven A. Hallstrom, 1380 Hallstrom Rd., and Daniel C. Hallstrom, 1910 Hallstrom Rd., all of Tillamook, Oreg. 97141**

**Continuation-in-part of Ser. No. 187,273, Jan. 24, 1994, abandoned. This application Nov. 14, 1994, Ser. No. 337,788**

**Int. Cl.[6] F01L** *31/02;25/02*

**U.S. Cl. 91—338** **23 Claims**

**1**. In a reversible fluid pressure drive unit wherein a movable component reciprocates in a housing between spaced limits by application of fluid pressure from a source alternately to opposite sides of the movable component and simultaneously exhausting fluid pressure from the side of the movable component toward which said component moves, the method of automatically reciprocating said movable component within said housing, comprising utilizing the lowering of exhaust fluid pressure in the housing when the movable component reaches its limit of movement in one direction within the housing to effect applying fluid pressure to the side of the movable component which will reverse its movement within the housing.



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**5,490,442**

**SAFETY CIRCUIT FOR A SERVO-HYDRAULIC REGULATING SYSTEM**

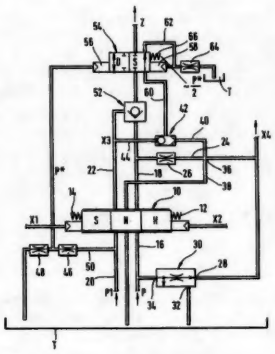
**Winfried Rub, Neustadt/Main, and Rainer Biener, Steinfeld-Hausen, both of, Germany, assignors to Mannesmann Rexroth GmbH, Germany**

**Filed Sep. 13, 1993, Ser. No. 120,209**

**Claims priority, application Germany, Sep. 17, 1992, 42 31 189.6**

**Int. Cl.[6] F15B** *11/08;* **F16D** *31/02*

**U.S. Cl. 91—445** **30 Claims**



**1**. A servo-hydraulic regulating system for controlling and actuating a load unit, the system comprising:

an operating line connecting a pressure fluid supply and the load unit;

a proportional valve incorporated into said operating line for controlling the load unit, said proportional valve being controlled by a measuring bridge which generates output pressure signals which control a position of said proportional valve, said proportional valve having a neutral setting in which said operating line is blocked, wherein said proportional valve assumes said neutral setting when said measuring bridge is balanced; and

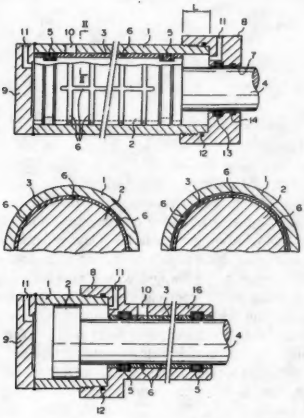
a safety circuit comprising a safety valve arrangement incorporated into said operating line, wherein said safety valve arrangement includes a directional control valve in said operating line, said directional control valve having a first valve position which opens said operating line, and a second valve position which blocks said operating line, wherein, in a power-up condition of the system, said safety valve arrangement blocks said operating line until said measuring bridge is balanced.

**5,490,443**

## PRESSURE-DISCHARGED TYPE RETAINING SYSTEM

**Yuzuru Atsuta, 12-5, Kanahodo 2-Chome, Asao-Ku, Japan**

**Continuation of Ser. No. 827,797, Jan. 30, 1992, abandoned, which is a continuation of Ser. No. 445,660, Dec. 13, 1989, abandoned. This application Jan. 11, 1994, Ser. No. 179,746**
**Claims priority, application Japan, Apr. 13, 1988, 63-90688**
**Int. Cl.[6] F15B** *15/26*
**U.S. Cl. 92—27** **6 Claims**



**1**. A pressure-discharged type retaining system comprising:

a. a cylindrical inner element comprising:

(i) an inner portion having an outer peripheral surface;

(ii) an outer layer integrally formed onto said inner portion, said outer layer made of a softer material than said inner portion, and said outer layer being integrally formed onto said outer portion by melting and depositing said softer material on said inner portion to cover said outer peripheral surface of said inner portion;

said inner element having a convex surface having a plurality of interconnected grooves axially spaced apart from one another;

b. a tubular outer element having a bore close fit to said cylindrical element for receiving said cylindrical element so that both elements are incapable of relative movement, said outer element being capable of resilient expansion;

c. means for supplying high-pressure fluid between said inner element and said outer element so that said outer element expands, allowing said inner element and said outer element to move relative to one another when said high-pressure fluid supply means is in a pressure-active condition.

**6**. A pressure-discharged type retaining system comprising:

a. a unitary heterogeneous cylindrical inner element having a bronze exterior metallurgically bonded to a ferrous interior said exterior being convex and having a plurality of interconnected grooves axially spaced apart from one another;

b. a tubular outer element having a bore close fit to said cylindrical element for receiving said cylindrical element so that both elements are incapable of relative movement, said outer element being capable of resilient expansion;

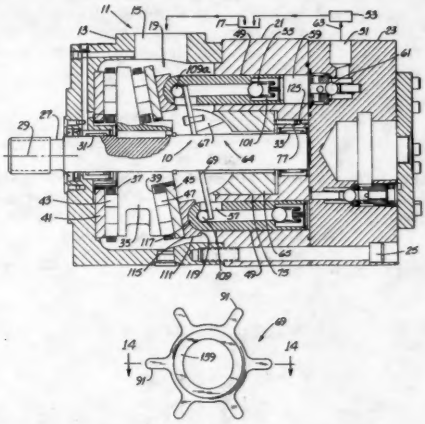
c. means for supplying high-pressure fluid between said inner element and said outer element so that said outer element expands, allowing said inner element and said outer element to move relative to one another when said high-pressure fluid supply means is in a pressure-active condition.

**5,490,444**

## PISTON PUMP WITH IMPROVED HOLD-DOWN MECHANISM

**Anthony M. Claas, Waukesha, Wis., assignor to Dynex/Rivett, Inc., Pewaukee, Wis.**

**Filed Oct. 3, 1994, Ser. No. 317,213**
**Int. Cl.[6] F01B** *3/00;13/04;* **F04B** *1/12*
**U.S. Cl. 92—71** **12 Claims**



**1**. In a pump having (a) a wobble plate, (b) at least one piston assembly reciprocated by the wobble plate, such assembly including a piston having a fill opening, and (c) a mechanism retaining the piston assembly in contact with the wobble plate, the improvement wherein the mechanism comprises:

a retention finger extending into the fill opening and contacting the piston assembly for retaining such assembly in contact with the wobble plate, whereby separation of the piston assembly from the wobble plate is substantially prevented.

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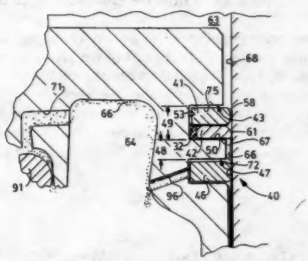
**5,490,445**

## ULTRA LOW DEVICE VOLUME PISTON SYSTEM

**V. Durga N. Rao, Bloomfield Township, and David A. Yeager, Plymouth, both of Mich., assignors to Ford Motor Company, Dearborn, Mich.**

**Filed Mar. 14, 1994, Ser. No. 213,400**
**Int. Cl.[6] F01B** *31/10;* **B32B** *15/18*
**U.S. Cl. 92—155** **15 Claims**



**1**. A piston and ring assembly operative within a cylindrical bore wall to retain pressurized fluid to one side of the assembly, the piston having a crown, an interior, and an annular side wall for movement along the bore wall, comprising:

(a) a piston having at least one annular groove in the side wall of the piston;

(b) at least two split compression rings in each said groove effective to each substantially annularly engage the bore wall, the rings having mating superimposed surfaces to facilitate movement of the rings in unison as a result of friction therebetween;

(c) a compressed elastomeric ring disposed in said groove, acting between the piston and compression ring most-remote from said piston crown, to resiliently bias at least said most-remote-compression ring against the bore wall;

(d) a solid film lubricant coating essentially all of said groove and non-mating surfaces of said compression rings to effect reduced friction between said compression rings and groove while being biased by said elastomeric ring.

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**5,490,446**

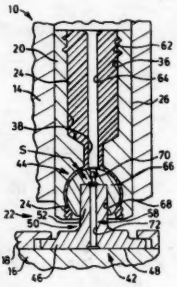
**APPARATUS AND METHOD FOR A PISTON ASSEMBLY**

**William K. Engel, Peoria, Ill., assignor to Caterpillar Inc., Peoria, Ill.**

**Filed Mar. 22, 1994, Ser. No. 215,430**

**Int. Cl.[6] F01B** *31/10*

**U.S. Cl. 92—157** **7 Claims**



1. A piston assembly for a fluid translating device, comprising:

a piston operative to reciprocate within the fluid translating device and having a longitudinally extending body with a cavity defined in one end thereof, the cavity having an irregularly shaped annular surface adjacent the end of the piston and a concave surface extending inwardly from the irregularly shaped annular surface;

a slipper having a first end portion with a load bearing end surface and a neck portion and a second end portion with a larger head portion extending from the neck portion, the head portion having a convex spherical surface and is disposed in the cavity with the convex spherical surface thereof being at a predetermined space from the concave surface of the cavity; and

a plastic material formed in the cavity during assembly and extends inwardly from the end of the piston filling the predetermined space defined between the cavity and a portion of the convex spherical surface, the plastic material being the only element that both permits the head portion of the slipper to pivot in the cavity of the piston and to solely retain the head portion of the slipper in the cavity of the piston.

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**5,490,447**

**AUTOMATIC ESPRESSO AND CAPPUCCINO MACHINE**

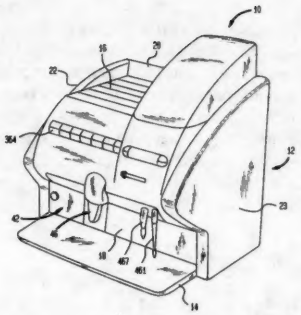
**Mario Giuliano, Cuneo, Italy, assignor to Faema S.p.A., Cuneo, Italy**

**Continuation-in-part of Ser. No. 761,366, Aug. 23, 1991, Pat. No. 5,265,520. This application Oct. 26, 1993, Ser. No. 142,220**

**Int. Cl.[6] A47J** *31/00*

**U.S. Cl. 99—286** **64 Claims**

1. Apparatus for dispensing coffee, comprising:



a coffee filling station for discharging a selected quantity of ground coffee;

a coffee dispensing station including a discharge outlet for emitting heated water, under pressure:

a number of filter units movable with respect to said coffee filling station and said coffee dispensing station, each of said filter units including a filter holder having an inlet, an outlet and a filter disc located between said inlet and outlet, said filter discs each being formed with a number of apertures of selected diameter located within a selected area thereof;

each of said filter units receiving a quantity of ground coffee at said coffee filling station, said filter units being selectively movable from said coffee filling station to said coffee dispensing station to receive heated water therefrom and then dispense brewed coffee into a container.

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**5,490,448**

**BEVERAGE BREWING MACHINE**

**Albrecht Weller, Steinbach; Georges Driesen, Niederhöchstadt; Andreas Peter, Kronberg; Peter Herber; Gerhard Schäfer, both of Frankfurt am Main; Stefan Schamberg, Usingen, and Andreas Birk, Bad Homburg, all of, Germany, assignors to Braun Aktiengesellschaft, Frankfurt, Germany**

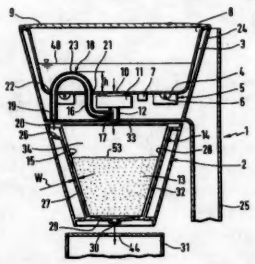
**PCT No. PCT/EP92/02082, § 371 Date Mar. 10, 1994, § 102(e) Date Mar. 10, 1994, PCT Pub. No. WO93/05691, PCT Pub. Date Apr. 1, 1993**

**PCT Filed Sep. 9, 1992, Ser. No. 204,308**

**Claims priority, application Germany, Sep. 13, 1991, 41 30 446.2**

**Int. Cl.[6] A47J** *31/00*

**U.S. Cl. 99—305** **35 Claims**



1. A beverage brewing machine comprising storing tank structure, brewing structure, supply reservoir structure, an electric heating device coupled to said supply reservoir structure, said supply reservoir structure having a bottom and being adapted to receive water to be heated by said electric heating device, outlet valve structure coupled to said supply reservoir structure for controlling flow of brewing water out of said supply reservoir structure onto the upper surface of a product, preferably ground coffee or tea

leaves,-contained in said brewing structure, from which, after extraction of the product, the so prepared brewed beverage finally discharges into said storing tank structure, siphon-like conduit structure coupled to said supply reservoir structure through which brewing water can propagate also along a path in said brewing structure out of said supply reservoir structure into said storing tank structure, other than through the upper surface of the product, said siphon-like conduit structure having a vertex disposed above said bottom of said supply reservoir structure, such that, only starting with a defined filling level in said supply reservoir structure, brewing water discharges also through said siphon-like conduit structure and not only through the upper surface of the product in said brewing structure.

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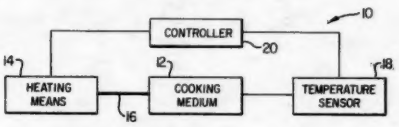
**5,490,449**

## TEMPERATURE CONTROLLER FOR COOKING APPLIANCE

**John A. Meister, Haughton, and John R. Davis, Shreveport, both of La., assignors to The Frymaster Corporation, Shreveport, La.**

**Filed Feb. 16, 1993, Ser. No. 17,758**
**Int. Cl.[6] A47J** *27/00*
**U.S. Cl. 99—330** **13 Claims**




1. A microprocessor controlled deep fat fryer, comprising:

a frypot for storing a quantity of cooking off;

means for heating said cooking oil in thermal communication with said frypot, in order to cook a food product;

means for sensing a sensed temperature of said cooking oil, said means for sensing being in thermal communication with said cooking oil;

a preprogrammed microprocessor controller to control a cook cycle, wherein said preprogrammed microprocessor controller is connected to said means for sensing in order to receive said sensed temperature and further connected to said means for heating;

a control routine executed by said preprogrammed microprocessor controller to account for variations in said food product's size and temperature by lengthening or shortening said cook cycle; and

a value determined by said preprogrammed microprocessor controller representing a working temperature, said working temperature differing from said sensed temperature by an amount sufficient to compensate for a thermal transit time between said means for heating and said means for sensing, wherein said preprogrammed microprocessor controller further operates To deactivate said means for heating until an end of said cook cycle if said cook cycle is within a preset number of seconds from ending and if said working temperature is within a preset number of degrees from a preset temperature.

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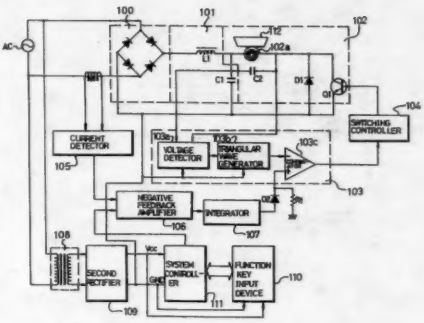
**5,490,450**

## INVERTER COOKER WITH A HIGH VOLTAGE/LOW VOLTAGE SEPARATING DEVICE

**Min G. Lee, Changwon, Rep. of Korea, assignor to Gold Star, Ltd., Seoul, Rep. of Korea**

**Filed Sep. 16, 1994, Ser. No. 308,085**
**Claims priority, application Rep. of Korea, Sep. 17, 1993, P93-19020**
**Int. Cl.[6] A47J** *37/00;* **H05B** *6/06;6/08;6/68*
**U.S. Cl. 99—337** **2 Claims**

1. An inverter cooker with a high voltage/low voltage separating device, comprising:




a first rectifying and smoothing means for rectifying and smoothing an input AC source of a current and providing an output of said first rectifying and smoothing means;

a container;

an inverter for heating food in said container with an eddy current generated by electromagnetic induction effect by switching the output of said first rectifying and smoothing means;

an inverter controller for generating a PWM signal for controlling said inverter;

a current detector for detecting said current from said input AC source, the current detector providing an output of said current detector;

a second rectifying and smoothing means for rectifying and smoothing said input AC source and providing an output voltage of said second rectifying and smoothing means;

a function key input means for selecting cooking and other functions and providing an output of said function key input means, the function key input means operating with the output voltage of said second rectifying and smoothing means;

a system controller for controlling the operation of said inverter cooker according to the output of said function key input means and for providing an output signal of said system controller, said system controller operating with the output of said second rectifying and smoothing means;

means for detecting the existence of said container according to the output of said current detector and for providing an output signal of said container detecting means; and

a high voltage/low voltage separating means for delivering the output signal of said system controller to said inverter controller with said system controller and said inverter controller electronically separated from each other, and delivering the output signal of said container detecting means of said system controller with said container detecting means and said system controller electrically separated from each other.

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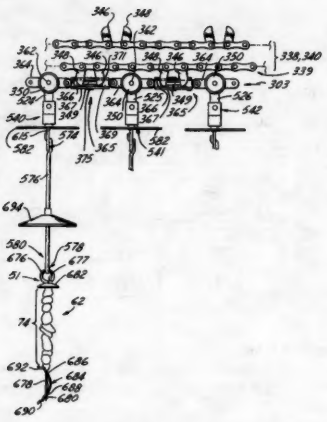
**5,490,451**

## FOOD CARRYING SKEWER

**John Nersesian, 1930 Ferry Park, Detroit, Mich. 48208**

**Division of Ser. No. 36,342, Mar. 24, 1993, Pat. No. 5,377,582. This application Jul. 14, 1994, Ser. No. 275,103**
**Int. Cl.[6] A47S** *37/04*
**U.S. Cl. 99—420** **6 Claims**

1. A skewer for use as a food product carrier as hung vertically in a food cooking oven, said skewer having hook means adjacent an upper end of said shank for removable hanging suspension of said skewer from a conveyor or like support, a stripper disk proximal to said upper end of said skewer and retained on said shank for movement longitudinally thereof for push-off removal of food products thereon, and a retention clip frictionally retained on said shank and yieldably movable therealong for adjustable retention of food products impaled on said shank while cooking, said retention clip comprising a strip of spring metal having spaced apertures for receiving said skewer shank therethrough when said



clip is flexed into a bowed and stressed condition, said skewer shank restraining said clip from returning to a free-state condition thereof so that said clip frictionally grips said skewer shank to yieldably restrain sliding movement of said clip along said skewer shank.

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**5,490,452**

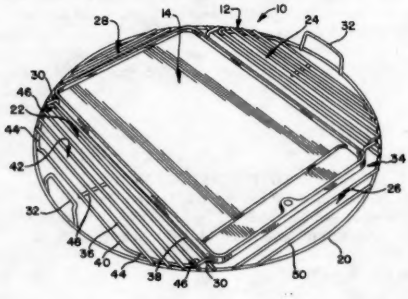
**COOKING GRATE ASSEMBLY FOR BARBECUE GRILLS**

**Erich J. Schlosser, Barrington, and James C. Stephen, Arlington Heights, both of Ill., assignors to Weber-Stephen Products Co., Palatine, Ill.**

**Filed Aug. 12, 1994, Ser. No. 289,942**

**Int. Cl.[6] A47J** *37/10*

**U.S. Cl. 99—422** **22 Claims**



**1**. A cooking grate assembly for use with a barbecue grill comprising:

a cooking grate defining an opening through the cooking grate;

a cooking insert removably positioned within the opening; and,

means associated with the cooking grate below the cooking grate for supporting the cooking insert within the opening, the means for supporting in supportive contact with the cooking insert below the cooking grate.

**5,490,453**

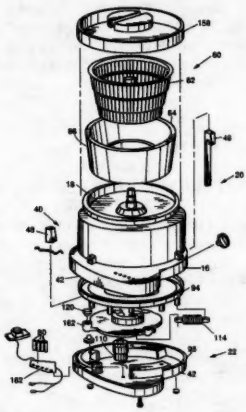
**CENTRIFUGAL FAT EXTRACTION APPARATUS**

**Spencer L. Mackay, North Hollywood, Calif., assignor to SAS TV Products, Inc., Tarrytown, N.Y.**

**Filed Jan. 9, 1995, Ser. No. 370,180**

**Int. Cl.[6] A47J** *43/04;* **B01D** *33/00;* **F26B** *17/24*

**U.S. Cl. 99—495** **20 Claims**



**1**. An apparatus for removing surface liquid from food comprising:

a) a container means for holding the food for circular rotation having perforations therein to allow the surface liquid to be driven away from the food;

b) a self-centering drive means for engaging and driving said container means and inducing an angular velocity to said container means rotatively spinning the food therein and driving the liquid centrifugally away from the food through said perforations in said container means; and

c) a housing means for retaining said self-centering drive means and allowing said self-centering drive means a predetermined degree of movement within one plane and perpendicular to a drive means axis and dimensioned to receive said container means and allowing said container means to rotatively move within said housing means in unison with said self-centering drive means, whereby said self-centering drive means and container means being free to move together a predetermined degree in one plane reducing overall movement and vibration of said housing means;

said self-centering drive means comprising a circular bearing plate member having an upwardly extending annular rim and defining a centrally disposed aperture along said drive means axis.

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**5,490,454**

**FOODSTUFF TREATING DEVICE**

**Bruce Ancona, New York, N.Y., and Edward H. Kilduff, Weehawken, N.J., assignors to B. Via International Housewares, Inc., Englewood Cliffs, N.J.**

**Filed Jan. 12, 1995, Ser. No. 371,748**

**Int. Cl.[6] A47J** *19/06;42/34;* **B30B** *9/02;* **B02C** *19/08*

**U.S. Cl. 99—510** **12 Claims**

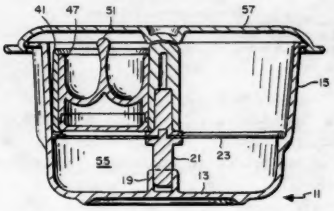
**1**. A device for treating a foodstuff, said device comprising:

a housing;

supported in said housing, a flat blade providing, on at least one face thereof, a circular cutting track;

a carrier providing an open ended cavity, said carrier being journaled with respect to said housing for eccentric motion around the center of said track; and

a plunger slidable within said cavity for pressing a foodstuff placed in said cavity against said blade, one end of said




plunger being provided with a grip enabling a user to rotate said carrier while exerting pressure on a contained foodstuff thereby to work the foodstuff against said cutting track.

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**5,490,455**

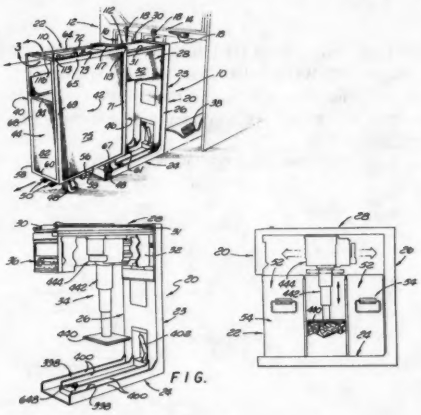
## AIRCRAFT TRASH COLLECTION AND COMPACTING APPARATUS

**Walter Conti, Woodside; William R. Feemster, Malibu; Jeffrey L. Felts, Canyon Country; Antony J. Fields, San Francisco; Robert W. Henderson, Claremont; Paul L. Howard, Palo Alto; Kevin F. Kaub, Palmdale; Joel A. Lederman, Canoga Park; Thomas M. Lee, Sherman Oaks; Gilbert Martinez, Castaic; Mark H. Mathews, Northridge; Ravi V. Patel, Newhall; Michael W. Waldrep, Santa Clarita, and John H. Wetzel, Glendora, all of Calif., assignors to Aero-Design Technology, Valencia, Calif.**

**Division of Ser. No. 198,072, Feb. 16, 1994. This application May 17, 1995, Ser. No. 442,677**

**Int. Cl.[6] B03B** *15/16*

**U.S. Cl. 100—50** **11 Claims**




1. A trash compactor unit primarily intended for use onboard an aircraft during flight in combination with a mobile trash collection trolley unit having multiple separate upwardly open trash collection chambers formed therein, said trash compactor unit comprising:

a rigid support frame including a generally horizontally disposed and elongated upper frame portion;

rail means formed on said upper frame portion for supporting said mobile trash collection trolley unit on said compactor unit with said upwardly open multiple trash collection chambers disposed vertically below said upper frame portion;

a carriage assembly movably mounted to said upper frame portion for movement therealong;

a compaction ram attached to said carriage assembly and projecting downwardly therefrom below said rail means, and having an extendible and retractable compacting platen coupled thereto for vertical movement between a retracted inoperative position and an extended compacting position;

indexing means for moving said carriage assembly along said upper frame portion to discrete preselected positions corresponding to each one of said multiple trash collection chambers of said trolley unit when supported by said rail means; and

platen operating means for extending and retracting said compacting platen at each of said discrete preselected positions.

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**5,490,456**

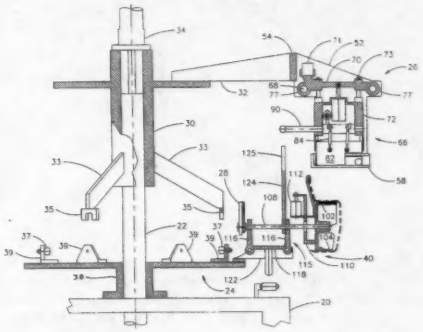
## AUTOMATED MULTIPLE STATION CAP PRINTING APPARATUS

**Orland W. Richardson, and Roger J. Gerdeman, both of Columbus, Ohio, assignors to ATM Machining Inc., Columbus, Ohio**

**Filed Oct. 25, 1994, Ser. No. 328,661**

**Int. Cl.[6] B41F** *17/00;15/10*

**U.S. Cl. 101—35** **5 Claims**



1. A screen printing apparatus for printing indicia upon the round portion of a cap comprising, in combination;

a) a base frame;

b) a plurality of cap receiving mandrel assemblies fixed in circumferentially spaced relationship to a support frame rotatably mounted to said base frame about a vertical axis defining a rotational path between a plurality of predetermined releasably fixed circumferentially spaced positions, at least two of said positions defining printing stations having a printing head assembly extending radially outward from the axis of rotation of said mandrel assemblies and connected to said base frame in a circumferentially fixed spaced position overlying said printing stations;

c) each of said cap receiving mandrel assemblies having a trolley frame including a cylindrically shaped printing platen mounted to said support frame for movement along a selected generally horizontal path, said cylindrical shaped printing platen being releasably engagable with a head portion of a cap and mounted to said trolley frame for rotation through a selected arc about a generally horizontal axis extending in a radial direction relative the rotational path of travel of said mandrel assemblies about said vertical axis;

d) each of said printing head assemblies being movably mounted to said base frame for vertical travel between a printing and non-printing position and including a print screen holding frame mounted in a fixed position within said printing head assembly and a squeegee assembly mounted for reciprocal travel along a selected generally horizontal path overlying said screen holding frame during a printing cycle;

e) first and second latch portions mounted on said squeegee assemblies and said trolley frames respectively for releasably connecting a squeegee assembly to a trolley frame when said printing head assemblies are disposed in a printing position and said mandrel assemblies are disposed at one of said

printing stations to permit said trolley frame and said printing platen to travel with said squeegee assembly at essentially the same linear speed along a generally parallel horizontal path during a printing cycle.

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**5,490,457**

**METHOD AND APPARATUS FOR PRINTING A FIBROUS WEB**

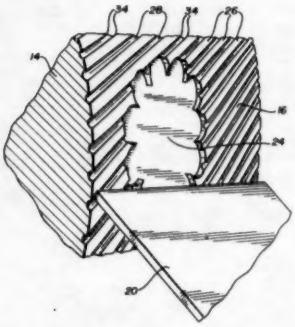
**Roger Boulanger, Ste-Julie; Flavio Metta, Longueuil, and Réal Contant, Repentigny, all of, Canada, assignors to Johnson & Johnson Inc., Quebec, Canada**

**Filed Apr. 2, 1993, Ser. No. 42,337**

**Claims priority, application Canada, Apr. 3, 1992, 2065121**

**Int. Cl.[6] B41M *1/10*; B41F *9/10***

**U.S. Cl. 101—170** **21 Claims**




**15**. A method for preventing build-up of dirt particles under a doctor blade scraping excess colorant from a printing roll which is in rolling contact with a fibrous web for printing on said fibrous web a principal pattern corresponding to a shaped cavity formed on a generally peripheral surface of said printing roll and defining a first colorant transfer zone having a maximum axial dimension less than the length of said printing roll, said method comprising the step of providing on said generally cylindrical peripheral surface an array of recesses in a spaced apart relationship substantially surrounding said first colorant transfer zone, said array of recesses constituting means for collecting dirt particles adhering to said printing roll which are being trained over said generally cylindrical surface when said printing roll is subjected to a scraping action by said doctor blade for removing excess colorant therefrom, said array of recesses defining a second colorant transfer zone printing a background pattern on said fibrous web upon which said principal pattern is visually eminent, said first colorant transfer zone having a higher colorant holding capacity per unit area of said generally cylindrical peripheral surface than said second colorant transfer zone, whereby said zones print on said fibrous web contrasting marks forming said principal and background patterns; and wherein said recesses define therebetween circumferentially discontinuous land areas, whereby every possible imaginary circumferential line contained in a plane perpendicular to a rotational axis of said printing roll and passing through a land area intercepts at least one recess of said array.

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**5,490,458**

**PRINTING PRESS CYLINDER ASSEMBLY**

**Warner H. Stuart, Thatcher, Id., assignor to Bryce Corporation, Memphis, Tenn.**

**Filed Apr. 13, 1994, Ser. No. 227,048**

**Int. Cl.[6] B41F *13/10***

**U.S. Cl. 101—375** **22 Claims**

**1**. A rotary printing cylinder assembly which comprises a hollow, elongate open-ended cylindrical shell having a center length axis extending along its length, cylinder heads disposed adjacent each of said open ends of said cylindrical shell, an elongate stub axle projecting outwardly from each cylinder head substantially co-axially of said center length axis of said cylindrical shell, said shell having conical bearing surfaces on its open ends which mate with conical bearing surfaces on said cylinder heads to provide a conical bearing surface interface between said cylinder heads and said shell to limit entry of said cylinder heads into said shell and to maintain said stub axles in said co-axial relationship with respect to said center length axis of said cylindrical shell, elongate alignment tubes projecting inwardly from each cylinder head and into said cylinder shell substantially co-axially with said center length axis of said cylindrical shell, connection means for connecting said alignment tubes together so as to enable relative longitudinal movement therebetween while restricting off-axis movement of said alignment tubes with respect to one another and said length axis, and engagement means for urging said cylinder heads inwardly against said cylinder shell so that said cylinder shell is axially compressed between said cylinder heads to provide said conical bearing surface interface, said connection means and said conical bearing surface interface cooperating when said shell is engaged between said cylinder heads to restrict off-axis movement of said alignment tubes and their associated cylinder heads and stub axles with respect to each other and said center axis.

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**5,490,459**

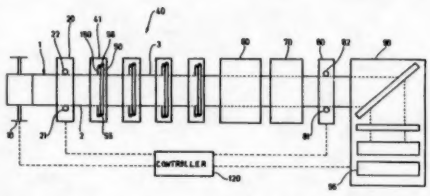
**PRINTING PRESS AND METHOD FOR REMOVING INK BUILD-UP WITH SIDEWAYS WEB MOVEMENT**

**Howard W. Hoff, Lee, N.H., assignor to Heidelberger Druckmaschinen AG, Heidelberg, Germany, and Heidelberg Harris, Inc., Dover, N.H.**

**Filed Feb. 24, 1995, Ser. No. 394,094**

**Int. Cl.[6] B41F *35/00***

**U.S. Cl. 101—423** **9 Claims**




**1**. A printing press having a running web comprising:

a web roll stand for holding an end of the web in a wound state;

at least one printing unit comprising a printing cylinder for printing images on the running web;

an entry web guide between the web roll stand and the printing unit for guiding the web as it enters the printing unit;

an exit web guide for guiding the web as it exits the printing unit; and

a wash unit for cleaning the printing cylinder during a wash cycle;

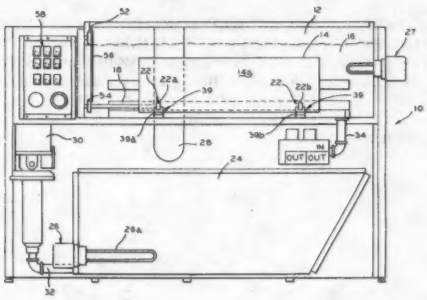
at least one of the entry web guide and the exit web guide being laterally moveable so as to be able to guide the web laterally during the wash cycle.

**5,490,460**

## AUTOMATED CLEANING OF PRINTING CYLINDERS

**Richard M. Soble, Highland Park; Timothy E. Owens, Downers Grove, and Gregg E. Johnson, River Grove, all of Ill., assignors to Graymills Corporation, Chicago, Ill.**

**Filed Jul. 27, 1994, Ser. No. 281,417**
**Int. Cl.[6] B41F** *35/00*
**U.S. Cl. 101—424** **10 Claims**




1. An automated apparatus for cleaning a printing cylinder, comprising:

a tank for receiving a printing cylinder that is to be cleaned of dried ink on a surface thereof;

a cleaning solution for said tank sufficient to substantially immerse said printing cylinder;

means for spraying said surface of said printing cylinder with said cleaning solution in said tank; and

means for rotating said printing cylinder as said spraying means is spraying said surface thereof;

said rotating means including two sets of wheels within said tank wherein at least one of said wheels of one of said two sets is a driven wheel and the wheels of the other of said two sets are idler wheels adjustably positioned relative to said set of wheels including said driven wheel;

said spraying means including a longitudinally extending spray manifold mounted within said tank longitudinally adjacent said set of wheels including said driven wheel and having a plurality of spray nozzles each directing a spray of said cleaning solution onto said surface of said printing cylinder.

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**5,490,461**

## TAG AND LABEL PRINTING PRESS

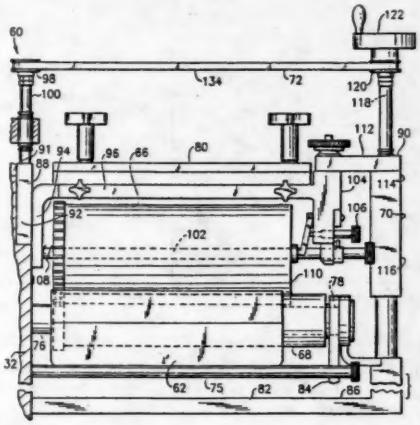
**Leon W. Beaudoin, 59 Driftwood La., Trumbull, Conn. 06611**

**Filed May 18, 1995, Ser. No. 444,230**
**Int. Cl.[6] B41F** *31/06*
**U.S. Cl. 101—483** **14 Claims**

7. A method of modifying a tag and label printing press comprising steps of:

removing a generally cantilevered printing roll support frame from a frame of the printing press, the support frame having been movably mounted on the printing press frame; and

connecting a frame extension to the printing press frame, a first portion of the frame extension being movably mounted to the




printing press frame at a location where the support frame was previously mounted to the printing press frame, and a second portion of the frame extension being stationarily connected to the printing press frame.

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**5,490,462**

**Patent Not Issued For This Number**

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**5,490,463**

## MATCH PERFORMANCE .22 CALIBER CARTRIDGE

**Bruce R. Lamberty, Coon Rapids; Shawn F. Callahan, Minneapolis, and Daniel N. Johnson, Andover, all of Minn., assignors to Federal-Hoffman, Inc., Anoka, Minn.**

**Filed Sep. 20, 1993, Ser. No. 123,166**
**Int. Cl.[6] F42B** *12/82*
**U.S. Cl. 102—439** **20 Claims**

1. A match performance 0.22 caliber cartridge comprising:

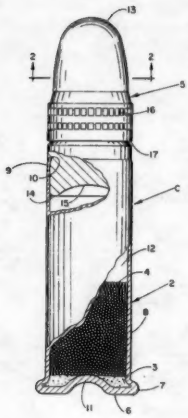
(a) a metal casing having head, rim, main body, and mouth portions;

(b) a bullet mounted within said mouth portion and having a leading portion extending forwardly of a circumferential lube groove formed therein;

(c) primer compound located within said rim portion and bearing against said head portion;

(d) propellant located within said main body portion in close proximity to said primer compound;

(1) said propellant being disposed within said main body portion in sufficient quantity to propel said bullet, upon firing of the cartridge, at a velocity within the range of 1,130–1,150 feet per second, and



(e) a coating of synthetic lubricant carried by only said leading portion of said bullet, said coating being of a thickness within the range of 0.0004"–0.0007".

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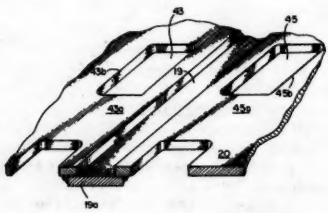
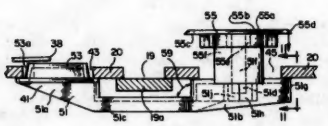
**5,490,464**

**PLUG ASSEMBLIES AND METHODS FOR PLUGGING HOLES IN RAILROAD AUTORACK CARS**

**John W. Rudibaugh, West Chester, and Charles L. Van Auken, Dillsburg, both of Pa., assignors to Pennsy Corporation, West Chester, Pa.**

**Filed Mar. 18, 1994, Ser. No. 210,357**
**Int. Cl.[6] B61D** *17/00*
**U.S. Cl. 105—422** **9 Claims**





1. A double plug assembly plugging deck holes in a deck of a railroad autorack car, comprising:

a first plug means for plugging a first of said deck holes from the bottom of the deck,

said first plug means having a plug which is inserted in the first deck hole from below the deck,

a second plug assembly means for plugging a second of said deck holes from the top of the deck,

said second plug assembly means including a second plug and clamping means for clamping the second plug means to the deck,

and connecting means for connecting the second plug assembly means to the first plug means and for holding the first plug means in place in the first deck hole.

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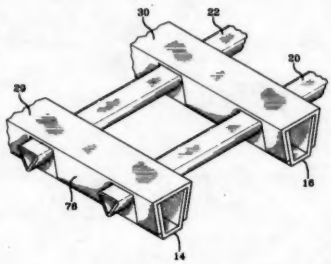
**5,490,465**

**PAPERBOARD/CORRUGATED BOARD PALLETS AND METHODS FOR MANUFACTURING SUCH PALLETS**

**Craig R. Hoyt, Columbus, and Edwin D. Wells, Cable, both of Ohio, assignors to Buckeye Boxes, Inc., Columbus, Ohio**

**Filed Dec. 27, 1993, Ser. No. 173,220**
**Int. Cl.[6] B65D** *19/00*
**U.S. Cl. 108—51.3** **14 Claims**



1. A pallet comprising:

(a) a plurality of generally parallel runners, each runner comprising a plurality of nested, paperboard laminations bonded together to form a U-shaped channel having a central web and legs extending from the central web, the central webs of the laminations being defined by spaced scores which are progressively more closely spaced toward the interior of the runner, each runner having a plurality of stringer-receiving notches spaced along and formed into opposite distal edges of the legs;

(b) a plurality of spaced, generally parallel, paperboard stringers matingly received and attached in said notches and extending transversely between said runners; and

(c) a plurality of generally U-shaped saddle caps, each saddle cap having opposite legs extending from a central web, said U-shaped saddle cap legs bonded to the oppositely directed legs of a runner, the central web of the saddle cap extending between and connecting the opposite, distal edges of the legs of the same runner.

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**5,490,466**

**ADJUSTABLE KEYBOARD SUPPORT**

**Niels Diffrient, Ridgefield, Conn., assignor to Howe Furniture Corporation, Trumbull, Conn.**

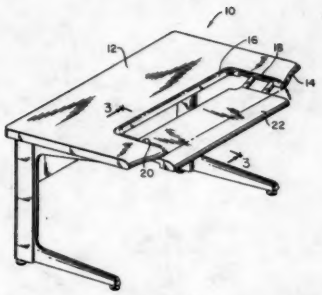
**Filed Mar. 15, 1994, Ser. No. 213,189**
**Int. Cl.[6] A47B** *57/00*
**U.S. Cl. 108—96** **9 Claims**

1. A table top having a top surface, an underneath surface, at least one edge, and a keyboard support platform comprising:

a substantially rectangular recess formed in said table top including first and second ends extending inwardly from said edge;

a substantially rectangular, vertically adjustable, platform substantially filling said recess when in a raised position, said platform having a bottom surface and a top surface;

first and second substantially identical parallel linkage bars, each having a first end pivotally mounted in the first end of said recess and a depending second end;




third and fourth parallel linkage bars substantially identical to said first and second bars, each having a first end pivotally mounted in the second end of said recess and a depending second end;

a first rotatable pivot rod carried by said platform, said first pivot rod having first and second ends secured, respectively, to the depending ends of said first and third bars;

a second rotatable pivot rod substantially parallel to said first pivot rod, said second pivot rod having first and second ends secured, respectively, to the depending ends of said second and fourth bars; and

means for locking the rotation of said pivot rods to stabilize the vertical position of said platform relative to said table top.

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**5,490,467**

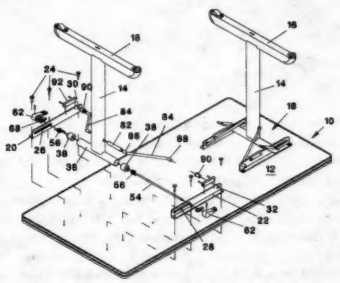
**FOLDING TABLE MECHANISM**

**Niels Diffrient, Ridgefield, Conn., assignor to Howe Furniture Corporation, Trumbull, Conn.**

**Filed Dec. 23, 1994, Ser. No. 363,366**

**Int. Cl.[6] A47B** *3/00*

**U.S. Cl. 108—133** **12 Claims**




1. In a table having a top with an under surface, at least one leg, and a mechanism for folding said leg between an upright position supporting said table top and a storage position substantially parallel with, and alongside, said under surface, the improvement wherein said folding mechanism comprises:

first and second spaced, substantially parallel, mounting frames carried by the under surface of said table top on opposite sides of said leg, said first frame defining a first slot therein and said second frame defining a second slot therein, said slots having aligned locking shoulders;

a tubular housing carried by said leg having first and second ends and extending substantially between said first and second frames;

a cross rod carried by said leg within said housing and having a first end terminating at said first mounting frame and a second end terminating at said second mounting frame;

first and second locking cams carried by the respective first and second ends of said cross rod and positioned in the respective first and second slots for rotation therein between a locking position engaging a respective locking shoulder and a release position wherein each of said cams is slidable in its respective slot;

means mounted within said tubular housing for resiliently urging each of said cams into its locking position;

release means for rotating said cross rod and lifting both of said cams out of their locking positions; and

means for pivoting said leg into its storage position while sliding said cams within their respective slots.

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**5,490,468**

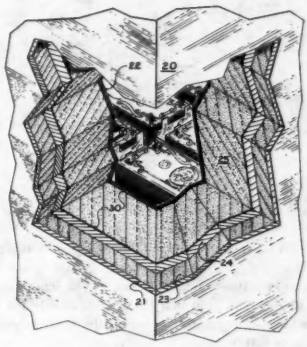
**SAFE WITH REFACTORY LAMINATE WALLS**

**Donald Polensky, San Jose, Calif., assignor to Lockheed Missiles & Space Co., Inc., Sunnyvale, Calif.**

**Filed Dec. 20, 1993, Ser. No. 169,273**

**Int. Cl.[6] E04B** *2/00*

**U.S. Cl. 109—80** **1 Claim**




1. A container having a laminate wall constructed to be resistant to the cutting effects of high temperature torches and to the drilling effects of high speed drills, said wall comprising:

a) a hardened steel outer panel;

b) a hardened steel inner panel;

c) a refractory abrasive layer disposed immediately adjacent the hardened steel outer panel;

said refractive abrasive layer comprising a composite containing silicon carbide granules of a coarse size and silicon carbide granules of a fine size for hindering drills of various sizes,

d) a thermally insulating porous ceramic layer of vitreously bonded ceramic fibers and having interstitial spaces between the ceramic fibers, said thermally insulating porous ceramic layer being disposed immediately adjacent the hardened steel inner panel, said thermally insulating porous ceramic layer consisting of vitreously bonded ceramic fibers made of a mixture of materials selected from the group consisting of silica, alumina, and zirconia, said thermally insulating porous ceramic layer functioning to retard heat transfer from said hardened steel outer panel to said hardened steel inner panel, said ceramic fibers being vitreously bonded by a flux selected from the group consisting of oxides of boron, silicon, and alkali and alkaline earth elements,

e) a substantially water-tight receptacle enclosing said thermally insulating porous ceramic layer,

f) water occupying the interstitial spaces between the ceramic fibers and contained within the substantially water tight receptacle for providing additional thermal protection, and

g) a thermally conductive layer of copper disposed between the refractory abrasive layer and the thermally insulating porous ceramic layer and having a thermal mass sufficient to inhibit melting of said inner hardened steel panel when heat is applied by a high-temperature torch said outer hardened steel panel.

**5,490,469**

## METHOD AND APPARATUS FOR HEATING THE BED MATERIAL IN A PFBC PLANT

**Roine Brännström, and Hjalmar Nevestveit, both of Finspong, Sweden, assignors to ABB Carbon AB, Finspongs, Sweden**

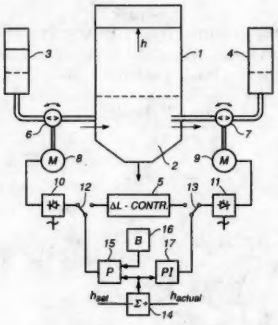
**PCT No. PCT/SE92/00579, § 371 Date Mar. 2, 1994, § 102(e) Date Mar. 2, 1994, PCT Pub. No. WO93/05341, PCT Pub. Date Mar. 18, 1993**

**PCT Filed Aug. 24, 1992, Ser. No. 199,288**

**Claims priority, application Sweden, Sep. 5, 1991, 9102547**

**Int. Cl.[6] F23C** *11/02*; **F22B** *31/00*

**U.S. Cl. 110—245** **7 Claims**




1. A method of heating bed material in a PFBC plant having a combustor and in which bed level adjustment due to a load change is accomplished by injecting or withdrawing bed material into/from said combustor, said heating method including the steps of:

1) heating and storing bed material in at least two storage vessels to maintain said bed material available for bed level adjustment at a temperature substantially corresponding to the bed material temperature;

wherein said heating step includes:

a) positioning feeding devices between each of said storage vessels and the combustor;

b) feeding out bed material from said combustor through one of said feeding devices into one of said at least two storage vessels;

c) feeding into said combustor equal amounts of bed material from another of said storage vessels through another of said feeding devices simultaneously with said step a);

d) performing said feeding out and feeding into at the same speed; and

2) maintaining constant bed level of the combustor during said heating.

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**5,490,470**

## TUBE ALIGNMENT SPACER BRACKET

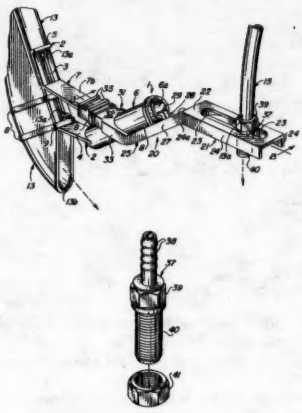
**John L. House, P.O. Box 552, Oak Grove, La. 71263**

**Continuation-in-part of Ser. No. 150,723, Nov. 12, 1993, abandoned. This application Nov. 30, 1994, Ser. No. 348,361**

**Int. Cl.[6] A01C** *15/00*

**U.S. Cl. 111—186** **20 Claims**

1. A tube alignment spacer bracket for mounting on a tube alignment bracket extending from the seed distribution tube of a planter having at least one treatment tube for dispensing treatment liquid in a seed furrow, said tube alignment spacer bracket comprising bracket means carried by the tube alignment bracket and at least one tube fitting provided on said bracket means for receiving the treatment tube and locating the treatment tube in substantially fixed proximity with respect to the seed distribution tube, whereby treatment liquid dispensed from the treatment tube strikes the seed furrow in a selected close proximity to seeds ejected from the seed distribution tube into the seed furrow.



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**5,490,471**

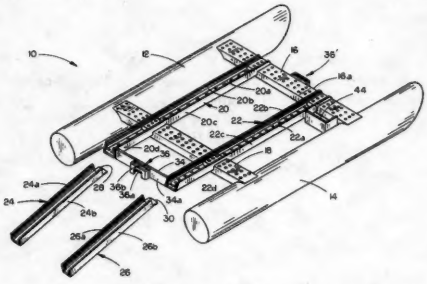
## RAFT FOR WHEELCHAIRS

**Michael P. Haggerty, P.O. Box 322, Spalding, Nebr. 68665**

**Filed Dec. 16, 1994, Ser. No. 357,454**

**Int. Cl.[6] B63B** *1/12*

**U.S. Cl. 114—61** **4 Claims**



1. A raft for wheelchairs, comprising:

a pair of elongated pontoons floatable on water and affixed in spaced-apart parallel relationship by forward and rearward cross-members affixed between the pontoons;

a pair of channel members, each having a base, opposing vertical side walls, and forward and rearward ends, mounted on said cross-members and extending therebetween in spaced-apart parallel relationship parallel to said pontoons;

said channel members having a width between side walls and being spread apart a distance to receive wheels of a wheelchair thereon, to support a wheelchair on the raft;

a pair of elongated ramps, each ramp having a first end with means for removably connecting the ramp to the ends of a channel;

each ramp having a channel shape, with a base and a pair of opposing side walls;

each ramp having a width between the side walls to receive the wheels of a wheelchair;

a first receiving bracket mounted between the rearward ends of said channels, for removably receiving a support arm attached to a motor for powering the raft in water;

a second receiving bracket mounted between the forward ends of said channels, for removably receiving a support arm attached to a motor for powering the raft in water;

each of said first and second receiving brackets including a generally ring-shaped strap having a vertically-oriented opening extending therethrough for receiving a depending support arm attached to a motor.

5,490,472

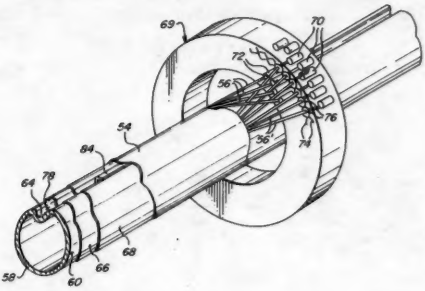
**CARBON FIBER SPAR AND METHOD OF MAKING**

**David J. Hulse, Mooresville, and John G. Heinemann, Charlotte, both of N.C., assignors to Isomat, Inc., Charlotte, N.C.**

**Continuation of Ser. No. 137,286, Oct. 14, 1993, abandoned. This application Nov. 18, 1994, Ser. No. 342,142**

**Int. Cl.[6] B63H** *15/00*

**U.S. Cl. 114—90** **27 Claims**



1. A sailboat spar comprising:

a first sleeve of resin and fiber having a circumference greater than a circumference of the spar;

a second sleeve of resin and fiber having a circumference substantially equal to the spar circumference;

a hollow between said first and second sleeves formed by a longitudinal portion of the first sleeve circumference which extends beyond the spar circumference, said hollow formed when said first and second sleeves are combined together with said first sleeve within said second sleeve to form the spar with a one piece circumference; and

an elongate cut in said second sleeve intersecting said hollow to form a sail-attaching groove integral in one piece with the spar.

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5,490,473

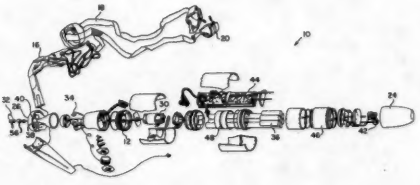
**EXPENDABLE UNDERWATER VEHICLE**

**Raymond A. Chace, Jr., East Freetown, Mass., and Mark C. Manning, Portsmouth, R.I., assignors to Sippican, Inc., Marion, Mass.**

**Filed Mar. 21, 1995, Ser. No. 408,060**

**Int. Cl.[6] B63G** *8/14*

**U.S. Cl. 114—330** **3 Claims**



1. An expendable underwater vehicle for use in training naval forces in anti-submarine warfare in ocean water, comprising:

a body having a length along a longitudinal axis of about three to five feet and a diameter of about five inches, the body comprising

a shroud at a rear end of the body which includes a propeller, elevators, and rudders;

actuators for controlling the elevators and the rudders;

an internal motor for driving the propeller;

an internal guidance and control subsystem for implementing a predetermined path for the vehicle in the ocean water by controlling the motor and the actuators to cause the vehicle to conform to the path;

an internal signal processing subsystem for simulating a submarine by generating signals representative of the submarine, causing corresponding acoustic signals to be transmitted into the ocean water, and varying the amplitudes of the acoustic signals which comprise

a first acoustic signal having a frequency of about 450 Hz and a variable amplitude having a range of about 40 dB,

a second acoustic signal having a frequency of about 600 Hz and a variable amplitude having a range of about 40 dB,

a third acoustic signal having a frequency of about 720 Hz and a variable amplitude having a range of about 40 dB, and

a fourth acoustic signal having a frequency of about 900 Hz and a variable amplitude having a range of about 40 dB; and

an internal power source for powering the signal processing subsystem, the guidance and control subsystem, the motor, and the actuators.

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5,490,474

**WATERCRAFT**

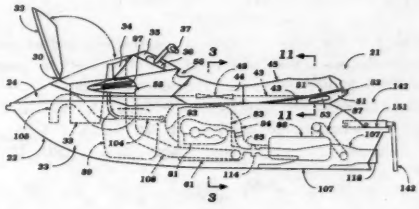
**Keijiroh Ikeda, Iwata, Japan, assignor to Yamaha Hatsudoki Kabushiki Kaisha, Iwata, Japan**

**Filed Apr. 22, 1994, Ser. No. 231,337**

**Claims priority, application Japan, Apr. 27, 1993, 5-100954; Apr. 28, 1993, 5-103100**

**Int. Cl.[6] B63B** *35/00*

**U.S. Cl. 114—343** **45 Claims**



1. A watercraft comprised of a hull defining an engine compartment containing an internal combustion engine for powering said watercraft, said hull including a deck area providing a passenger's area containing a control for the watercraft and operable by an operator in said passenger's area, at least one rear-view mirror mounted on said deck area in proximity to said rider's area, said rear-view mirror including an outer housing containing a mirror and extending outwardly from said deck area, an air inlet in said outer housing, and conduit means for conveying ventilating air between said outer housing and said engine compartment for ventilation of said engine compartment.

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5,490,475

**MAXIMUM TEMPERATURE INDICATOR**

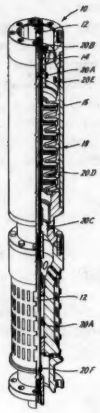
**Edward W. S. Bryant, and Burton T. Mackenzie, both of Lawrence, Kans., assignors to Camco International Inc., Houston, Tex.**

**Filed Jan. 26, 1994, Ser. No. 187,688**

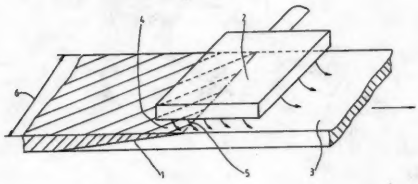
**Int. Cl.[6] G01K** *1/14;11/00;11/06*

**U.S. Cl. 116—217** **8 Claims**

1. A maximum temperature indicator comprising a body of polymeric material that undergoes a physical change that is not visually detectable, comprising the formation of crystalline structures having melting temperatures correlatable to a maximum temperture to which the polymeric material was exposed.

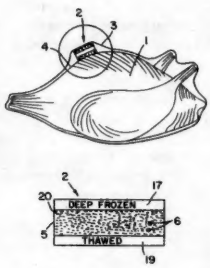


5,490,477
**PROCESS FOR THE PRODUCTION OF SEMICONDUCTOR FOILS AND THEIR USE**
**Philippe Knauth, Marseille Cedex, France; Horst Lange, Bochum, Germany; Ingo Schwirtlich, Krefeld, Germany, and Karsten Wambach, Ratigen, Germany, assignors to Bayer Aktiengesellschaft, Germany**
**Continuation of Ser. No. 835,511, Feb. 14, 1992, abandoned. This application Sep. 23, 1993, Ser. No. 125,937**
**Claims priority, application Germany, Feb. 26, 1991, 41 05 910.7**
**Int. Cl.[6] C30B** *13/08*
**U.S. Cl. 117—43** **12 Claims**



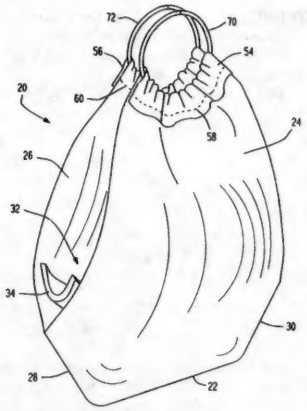
1. A process for the production of high-purity semiconductor foils which comprises treating semiconductor foils having an upper surface with reactive gases in the directionally crystallizing state to deplete volatile compounds of impurities from the upper surface of the foil through escape with the reactive gases, the crystallization direction being parallel to a vector normal to the upper surface of the foil.

5,490,476
**TEMPERATURE INDICATOR FOR DEEP-FROZEN PRODUCTS**
**Ronald J. Veitch, Maxdorf; Helmut Jakusch, Frankenthal, and Peter Heilmann, Bad Duerkheim, all of, Germany, assignors to BASF Magnetics GmbH, Mannheim, Germany**
**Continuation of Ser. No. 41,408, Mar. 31, 1993, abandoned. This application Aug. 8, 1994, Ser. No. 286,253**
**Claims priority, application Germany, Apr. 1, 1992, 42 10 739.3**
**Int. Cl.[6] G01K** *1/02;11/06;1/14*
**U.S. Cl. 116—217** **6 Claims**




1. A device for indicating whether the permissible storage temperature of products stored in the frozen state has been exceeded, comprising a container, with a transparent front surface and a back surface, which contains, in its interior, both a transparent carrier medium having a known melting point in the range from about 0° to −50° C., and finely divided magnetic pigments, said device further comprising a magnetic means having a patterned magnetic field which is applied to the back surface of the container after it is frozen, such that the magnetic pigments will assume the pattern of said magnetic field should the carrier medium ever thaw.

5,490,478
**ANIMAL HAMMOCK**
**Teddi A. Cole, 10613 Lakeside Oaks Ct., Burke, Va. 22015**
**Filed Oct. 4, 1994, Ser. No. 324,753**
**Int. Cl.[6] A01K** *29/00*
**U.S. Cl. 119—28.5** **6 Claims**



1. An animal hammock comprising
a vertically elongated rectangular cloth body folded about a lower horizontal axis to form upper extending ends;
a pair gussets formed on respective opposite bottom corners at the lower horizontal axis by lines of stitches extending diagonally downward and inward from side edges of the folded body to the lower horizontal axis;
the side edges of the folded body above the gussets being open to permit animal access; and

means secured to the upper ends for hanging the body from a support.

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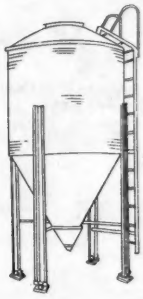
**5,490,479**

## METHOD AND A PRODUCT RESULTING FROM THE USE OF THE METHOD FOR ELEVATING FEED STORAGE BINS

**Matti Shalev, P.O. Box 843, Statesville, N.C. 28677**

**Filed May 10, 1993, Ser. No. 58,208**
**Int. Cl.[5] E04H** *7/22;* **A01K** *5/00*
**U.S. Cl. 119—51.01** **2 Claims**



**1**. A method of elevating feed storage bins having multiple supporting legs without lifting the entire feed storage bin comprising the steps of: affixing a lifter engaging member to one of the multiple supporting legs; positioning a lifter proximate the one of the legs and the affixed engaging member; engaging and lifting the leg to a predetermined height sufficient to install monitoring equipment in a fixed relationship with the leg to elevate the supported bin at the leg location to a higher elevation commensurate with the height of the monitoring equipment; and sequentially lifting each of the other legs and installing monitoring equipment to elevate the supported storage bin so that the storage bin has been elevated a distance consistent with the height of the monitoring equipment when the monitoring equipment is in place.

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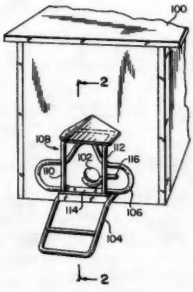
**5,490,480**

## SQUIRREL-INHIBITING SHIELD FOR A BIRD FEEDER

**Gilbert Dumond, 76 Golden Hill Rd., Danbury, Conn. 06810**

**Filed Dec. 28, 1994, Ser. No. 365,671**
**Int. Cl.[6] A01K** *39/01*
**U.S. Cl. 119—57.9** **19 Claims**




**1**. A bird feeder comprising:

an enclosure having a cavity capable of housing bird seed, the enclosure having a hole to allow bird seed housed in the cavity to escape therefrom;

a perch attached to the enclosure, the perch capable of holding a bird thereon for feeding through the hole;

a shield located offset from and substantially in front of the hole and in proximity to the perch, the shield having three substantially U-shaped members capable of inhibiting squirrels from eating the bird seed through the hole; and

a structure attached between the enclosure and the shield to secure the shield in its offset position.

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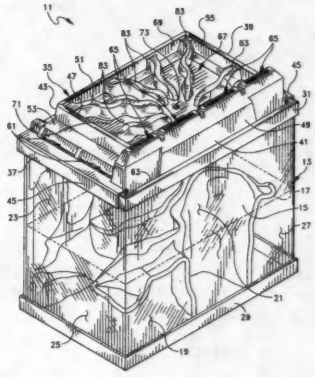
**5,490,481**

## AQUARIUM

**Finn A. Strong, Newport, R.I., assignor to Finn Strong Designs, Inc., North Kingstown, R.I.**

**Filed Nov. 16, 1994, Ser. No. 340,628**
**Int. Cl.[6] A01K** *63/00*
**U.S. Cl. 119—259** **20 Claims**




**1**. An aquarium comprising:

a tank having an interior region formed by a bottom and at least one wall extending up from the bottom, said tank being adapted to contain water;

a cover supported by the wall of the tank, said cover substantially enclosing the interior region of the tank;

an intake port formed in the cover for drawing relatively cool, dry ambient air into the tank; and

an exhaust port formed in the cover for exhausting relatively hot air from the tank, said exhaust port being elevated with respect to said intake port and in fluid communication with the intake port and the interior region of the tank, the arrangement being such that hot air rises within the interior region of the tank and is exhausted from the interior region via the exhaust port, thereby causing cool, dry ambient air to be drawn into the tank through said intake port, the introduction of ambient air into the tank preventing the build-up of condensation on the wall of the tank.

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**5,490,482**

## TWO CYCLE ENGINE WITH PISTON MOUNTED POPPET VALVE OPERATING MECHANISM

**William Genet, 2742 Frembes, Waterford, Mich. 48329**

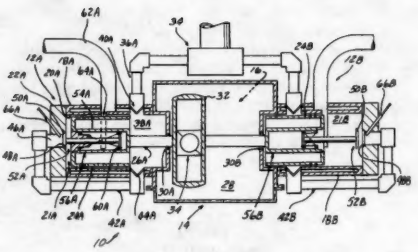
**Filed Feb. 24, 1994, Ser. No. 201,373**
**Int. Cl.[6] F02B** *75/02*
**U.S. Cl. 123—47 R** **9 Claims**

**1**. A two cycle internal combustion piston engine comprising:

a cylinder block defining a cylinder bore;

a cylinder head closing off said cylinder bore;

a piston slidable in said cylinder bore having a top portion defining, together with said cylinder bore and said cylinder head, a combustion chamber;



a crankshaft and means rotating said crankshaft by reciprocation of said piston in said cylinder bore;

an exhaust port in said cylinder bore opened by movement of said piston towards bottom dead center;

an intake port in said cylinder head allowing inflow of air into said combustion chamber;

fuel injection means directing a fuel charge into said combustion chamber during each engine intake cycle; and

a poppet valve including a valve head and a valve stem, said valve stem slidably mounted in said piston top and spring means carried by said piston urging said poppet valve outward so that said valve head projects outwardly from said piston top and into said combustion chamber;

a valve seat associated with said air intake port and aligned with said poppet valve head so that said poppet valve head is driven to seat onto said valve seat as said piston moves towards top dead center; said spring means overcome by continued movement of said piston towards top dead center to slide said poppet valve stem back into said piston.

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**5,490,483**

**TWO-CYCLE INTERNAL COMBUSTION ENGINE**

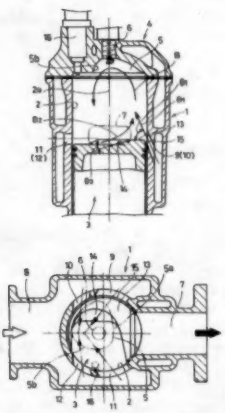
**Makoto Tanikake; Yoshiki Morinaga; Katsuhiko Shirai, and Masanori Shimada, all of Osaka, Japan, assignors to Daihatsu Motor Co., Ltd., Japan**

**Filed Dec. 30, 1994, Ser. No. 367,073**

**Claims priority, application Japan, Feb. 23, 1994, 6-025216; Apr. 12, 1994, 6-073006; Apr. 12, 1994, 6-073007; Aug. 23, 1994, 6-198275**

**Int. Cl.[6] F02B** *25/14*

**U.S. Cl. 123—65 P** **15 Claims**



**1**. A two-cycle internal combustion engine comprising:

a cylinder in which a piston reciprocates, the cylinder having a top portion provided with a combustion chamber in which a spark plug faces;

an exhaust port laterally opening into the cylinder;

at least one first scavenging port opening into the cylinder at one side of the exhaust port; and

at least one second scavenging port opening into the cylinder at another side of the exhaust port opposite to said one side;

wherein each of the first and second scavenging ports directs scavenging gas away from the exhaust port; and

wherein the first scavenging port opens into the cylinder with an upward inclination for directing a first portion of the scavenging gas upwardly toward the top portion of the cylinder, while the second scavenging port is oriented to direct a second portion of the scavenging gas transversely of the cylinder toward a wall portion of the cylinder where the first scavenging port is formed.

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**5,490,484**

**AIR INTAKE SYSTEM OF AN INTERNAL-COMBUSTION ENGINE**

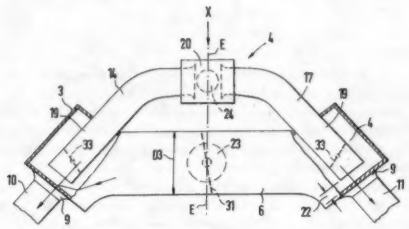
**Erwin Rutschmann, Tiefenbronn, Germany, assignor to Dr. Ing. h.c.F. Porsche AG, Weissach, Germany**

**Filed Aug. 26, 1994, Ser. No. 297,108**

**Claims priority, application Germany, Sep. 9, 1993, 43 30 566.0**

**Int. Cl.[6] F02B** *27/00*

**U.S. Cl. 123—184.49** **21 Claims**



**1**. Air intake system of a multicylinder two-row internal combustion engine, with the cylinders of both rows each being connected by intake pipes to a resonance chamber associated with the respective row, and with at least one connecting pipe running between the resonance chambers, into which fresh air flows and which has at least one controllable blocking element, wherein each cylinder is provided with at least one separate corresponding resonance pipe, each of said resonance pipes being arranged to extend from one of said resonance chambers to a common chamber which is common to the resonance pipes and provided with a fresh air inlet, and wherein a controllable blocking element is located in at least one of the resonance pipes.

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**5,490,485**

**ROTARY VALVE FOR INTERNAL COMBUSTION ENGINE**

**Iskender V. Kutlucinar, 15207 Frederick Rd., Rockwell, Md. 20850**

**Filed Jun. 14, 1994, Ser. No. 259,398**

**Int. Cl.[6] F01L** *7/02*

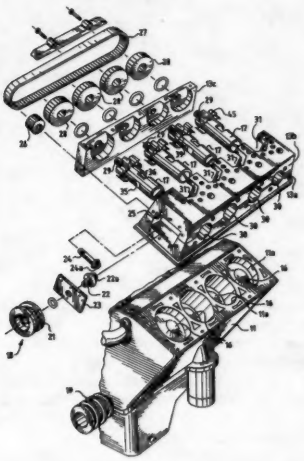
**U.S. Cl. 123—190.4** **36 Claims**

**1**. A rotary valve comprising:

a generally elongated cylindrical unitary body having first and second ends and a longitudinally extending axis of rotation and defining an intake port and an exhaust port;

said unitary body providing an intake passageway extending between said first end of said unitary body and said intake port and an exhaust passageway extending from said exhaust port to said second end of said unitary body;

intake acceleration means disposed in said intake passageway for accelerating a flow of intake fluid through said intake



passageway from said first end to said intake port, said intake acceleration means comprising a generally helically-shaped blade which is disposed in said intake passageway and extends along and is helically twisted about said axis of rotation of said body; and

exhaust acceleration means disposed in said exhaust passageway for accelerating a flow of exhaust fluid through said exhaust passageway from said exhaust port to said second end of said unitary body, said exhaust acceleration means comprising a generally helically-shaped blade which is disposed in said exhaust passageway and extends along and is helically twisted about said axis of rotation of said body.

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**5,490,486**

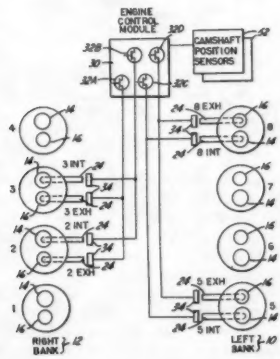
## EIGHT CYLINDER INTERNAL COMBUSTION ENGINE WITH VARIABLE DISPLACEMENT

**Matthew B. Diggs, Farmington, Mich., assignor to Ford Motor Company, Dearborn, Mich.**

**Filed Oct. 5, 1994, Ser. No. 318,407**

**Int. Cl.[6] F02B** *77/00*

**U.S. Cl. 123—198 F** **13 Claims**




1. An eight cylinder internal combustion engine, comprising:

a cylinder block arranged in a V-type configuration, having a left bank of four cylinders and a right bank of four cylinders;

a plurality of intake poppet valves for admitting air and fuel into each of the cylinders and a plurality of exhaust poppet valves for allowing combustion products to be discharged from the cylinders, with at least one intake valve and at least one exhaust valve for each cylinder;

a plurality of valve actuators for selectively opening said poppet valves in timed relation to a crankshaft which is rotatably mounted within the engine; and

an engine controller for operating the valve actuators so as to disable certain cylinders of the engine by rendering inoperative the intake and exhaust valves associated with such cylinders, with said controller having a first common control element which operates the intake valves of a first pair of cylinders located in the left bank, a second common control element which operates the exhaust valves of said first pair of cylinders, a third common control element which operates the intake valves of a second pair of cylinders located in the right bank, and a fourth common control element which operates the exhaust valves of the second pair of cylinders.

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**5,490,487**

## THROTTLE VALVE CONTROL DEVICE

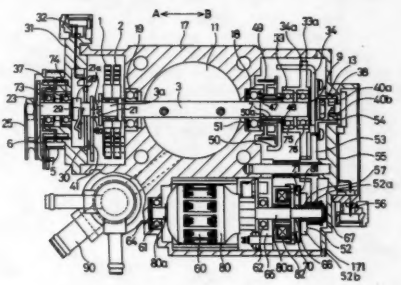
**Hideki Kato, Toyohashi; Tosio Matsuzawa, Toyota; Touru Shimizu, Nishikasugai; Tetsuji Yamanaka, and Yoshiyuki Kouno, both of Kariya, all of, Japan, assignors to Nippondenso Co., Ltd, Kariya, Japan**

**Filed Apr. 3, 1995, Ser. No. 415,518**

**Claims priority, application Japan, Apr. 4, 1994, 6-066150; Jan. 12, 1994, 6-246329**

**Int. Cl.[6] F02D** *7/00*

**U.S. Cl. 123—399** **17 Claims**




1. A throttle valve control device including a throttle valve for supplying controlled air to an engine, said device comprising:

a housing for said throttle valve;

a lever member connected to said throttle valve for driving said throttle valve;

a first spring member secured to said housing and connected to said lever member or biasing said throttle valve in a direction to open said throttle valve;

a guard member engageable with said lever member in response to an accelerator pedal operation for limiting said lever member to open said throttle valve within a set angle;

a second spring member for biasing said guard member in a direction to close said throttle valve where a biasing force of said second spring member is greater than a biasing force of said first spring member;

an electric motor unit disposed in said housing for controllably generating a driving force; and

throttle valve control means, disposed coaxially with said motor unit between said throttle valve and said motor unit, for transmitting the driving force from said motor unit to said throttle valve, said valve control means opening said throttle valve and said guard member against the biasing force of said second spring member.

**5,490,488**

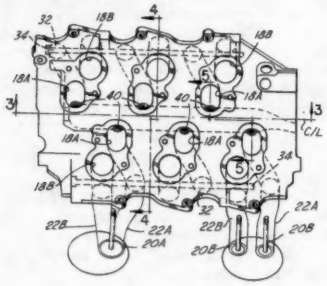
## INTERNAL COMBUSTION ENGINE INTAKE MANIFOLD WITH INTEGRAL EGR COOLER AND PORTED EGR FLOW PASSAGES

**Piero Aversa, Dearborn; David C. Ives, Canton; Hajnal Minger, Dearborn; William K. Ojala, Bingham Farms, and Philip R. Zeiser, Dearborn, all of Mich., assignors to Ford Motor Company, Dearborn, Mich.**

**Filed Apr. 5, 1995, Ser. No. 417,354**

**Int. Cl.[6] F02M** *25/07*

**U.S. Cl. 123—570** **15 Claims**



**1**. An intake manifold for a multicylinder, v-type reciprocating internal combustion engine having a cylinder block with two cylinder heads mounted thereto and a crankshaft mounted therein, with said manifold comprising:

a plurality of intake runners for conducting air and fuel to a plurality of intake ports formed in the cylinder heads;

an EGR supply passage formed in said manifold and extending generally parallel to the crankshaft of the engine, with said passage being located between said cylinder heads;

a plurality of secondary EGR passages, with at least one of said secondary passages extending generally laterally from said EGR supply passage to at least one of said intake runners; and

an engine coolant passage formed in said manifold, with said engine coolant passage extending generally parallel to the EGR supply passage and having a common wall with said EGR supply passage.

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**5,490,489**

## IGNITION SYSTEM FOR AN INTERNAL COMBUSTION ENGINE

**Ulrich Mayer, Waiblingen; Peter Kaltenbrunn, Bietigheim-Bissingen; Wolfgang Hoeptner, Uhingen, and Karsten Mischker, Leonberg, all of, Germany, assignors to Robert Bosch GmbH, Stuttgart, Germany**

**PCT No. PCT/DE92/00938, § 371 Date Jun. 6, 1994, § 102(e) Date Jun. 6, 1994, PCT Pub. No. WO/9311356, PCT Pub. Date Jun. 10, 1993**

**PCT Filed Nov. 12, 1992, Ser. No. 244,645**

**Claims priority, application Germany, Dec. 5, 1991, 41 40 147.6**

**Int. Cl.[6] F02P** *11/00*

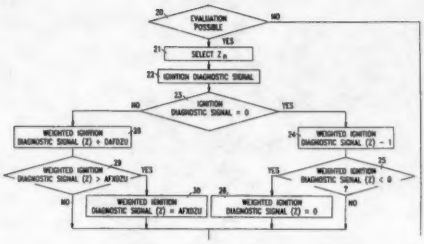
**U.S. Cl. 123—630** **18 Claims**

**1**. An ignition system for an internal combustion engine, comprising:

a monitoring circuit for generating an ignition diagnostic signal, the ignition diagnostic signal indicating one of a correct ignition and an incorrect ignition;

a sensor circuit coupled to the monitoring circuit for monitoring the occurrence of an ignition; and

a control unit, coupled to the monitoring circuit, the control unit controlling the monitoring circuit to set the ignition diagnostic signal to a first predetermined level prior to each scheduled ignition and controlling the monitoring circuit to set the



ignition diagnostic signal to a second predetermined level after each correct ignition, the control unit also

monitoring the level of the ignition diagnostic signal, the control unit performing a statistical weighting, for each cylinder of the internal combustion engine, of a current ignition diagnostic signal and each preceding ignition diagnostic signal to obtain a current ignition diagnostic value, the control unit triggering at least one emergency measure for protecting a catalyst when the current ignition diagnostic value exceeds a predetermined fault threshold, wherein the control unit increases the current ignition diagnostic value by a first predetermined amount in response to each incorrect ignition and decrements the current ignition diagnostic value by a second predetermined amount in response to each correct ignition.

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**5,490,490**

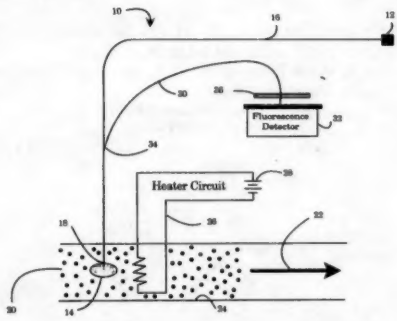
## ON-BOARD GAS COMPOSITION SENSOR FOR INTERNAL COMBUSTION ENGINE EXHAUST GASES

**Willes H. Weber, Ann Arbor; Bennie D. Poindexter, Westland, and Jeffrey T. Remillard, Ann Arbor, all of Mich., assignors to Ford Motor Company, Dearborn, Mich.**

**Filed Apr. 27, 1995, Ser. No. 363,844**

**Int. Cl.[6] F02D** *41/14;* **G01N** *30/02*

**U.S. Cl. 123—697** **20 Claims**




**1**. An on-board gas composition sensor for an internal combustion engine, for monitoring oxygen content in exhaust gas from the internal combustion engine, the gas composition sensor comprising, in combination:

light source means for generating excitation light in a preselected wavelength range;

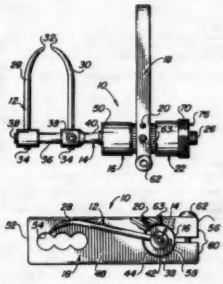
sensor means comprising a sensor body of porous high-temperature fluorescent inorganic oxide ceramic, for emitting an optical fluorescence signal responsive to oxygen content in the exhaust gas upon exposure of the sensor body to the excitation light at 400°–650° C.; and fluorescence detector means for receiving a preselected wavelength range of the optical fluorescence signal which is above the excitation light wavelength range, and for generating an exhaust gas oxygen content output signal in response to the optical fluorescence signal.

**5,490,491**

## ARCHERY ARROW REST ASSEMBLY WITH ADJUSTABLE ANGLE AND TENSION CAPABILITY

**Vincent F. Troncoso, Montrose, Colo., assignor to Golden Key Futura, Inc., Montrose, Colo.**

**Filed Jan. 9, 1995, Ser. No. 370,091**
**Int. Cl.[6] F41B** *5/22*
**U.S. Cl. 124—44.5** **5 Claims**



**1.** An improved archery arrow rest assembly with adjustable angle and tension capability, said arrow rest assembly comprising, in combination:

a) an archery arrow shaft support having a front end adapted to support an arrow shaft and an opposite rear end;

b) a transverse cross-bar having a free end, an intermediate portion and an opposite end, said free end being releasably connected to the rear end of said support, for projecting said support forwardly into the window of an archery arrow bow, said cross-bar being generally circular in transverse cross-section;

c) an elongated cylindrical barrel receiving said intermediate portion of said cross-bar for rotation within said barrel, the outer periphery of said barrel being striated with regularly spaced longitudinally extending grooves, said barrel having a first end adjacent said free end of said cross-bar and an opposite end adjacent said opposite end of said cross-bar;

d) a forwardly and rearwardly extending elongated mounting block having a front end and an opposite rear end, said front end of said block being adapted to be secured to the sidewall of the riser section of an archery bow, which sidewall defines said window on one side thereof, and said rear end being adapted to extend rearwardly of said riser section to a position therebehind, said rear end of said block slideably receiving said barrel bearing said transverse cross-bar, said opposite end of said barrel and transverse cross-bar extending therethrough to a point on the side of said sidewall remote from said window;

e) locking means releasably locking said barrel to said rear end of said block in a desired transverse position;

f) a click blade extending through said rear end of said block into releasable contact with said peripheral grooves of said barrel, thereby providing incremental rotation of said barrel and cross-bar for selective adjustment of the angle of said arrow shaft support;

g) a cup slideably received over said opposite end of said cross-bar for rotation therearound; and,

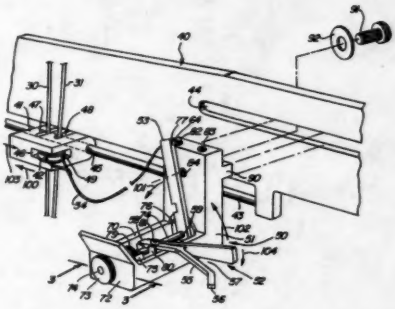
h) a spring releasably connected to said opposite end of said barrel and to said cup, and a lock releasably locking said cup to said cross-bar and barrel, said spring applying rotational spring bias to said cross-bar and support, which bias is adjustable by rotation of said cup before locking said cup to said cross-bar.

**5,490,492**

## RETRACTING ARROW REST FOR ARCHERY BOW

**Huey P. Savage, Lake Forest, Calif., assignor to Savage Systems, Inc., Oak Grove, La.**

**Filed Jan. 27, 1994, Ser. No. 188,253**
**Int. Cl.[6] F41B** *5/22*
**U.S. Cl. 124—44.5** **23 Claims**



**1.** For use in combination with an archery bow and arrow, a retracting arrow rest comprising:

a cable slide movable as said bow is drawn;

a body secured to said bow at a position forward of said cable slide;

an arrow guide having an arrow-receiving notch formed therein;

support means for rotatably supporting said arrow guide upon said body rotatable between a raised position and a retracted position, said support means including adjustable stop means for limiting the rotational movement of said arrow guide in both rotational directions;

coupling means for coupling said support means to said cable slide; and

spring means for urging said support means toward said retracted position.

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**5,490,493**

## MACHINE FOR DELIVERING BALLS, ESPECIALLY TENNIS BALLS

**Werner Salansky, Reinlgasse 5-9, A-1140 Wien, Austria**

**Filed Jul. 6, 1993, Ser. No. 85,817**
**Claims priority, application Austria, Jan. 4, 1991, 14/91**
**Int. Cl.[6] A63B** *69/40*
**U.S. Cl. 124—78** **22 Claims**

**1.** A machine, comprising:

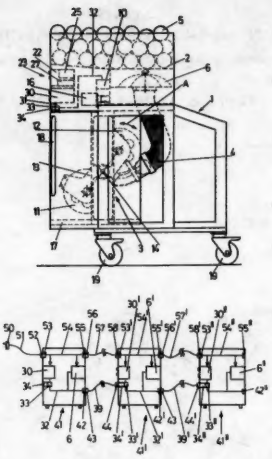
a ball feeder for feeding balls from a ball magazine;

a ball ejector for receiving the balls fed by said ball feeder;

a machine feed controller for sending internal control signals to said ball feeder to control an ejection time of the balls ejected by said ball ejector;

a deactivation device for deactivating said machine feed controller; and

a control input electrically connected with said ball feeder that is capable of having an external control cable detachably attached thereto such that external control signals can be fed to said ball feeder controlling the ejection time of the balls ejected by said ball ejector as an alternative to the internal control signals.

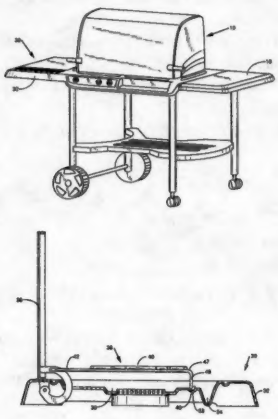


5,490,494

**SIDE BURNER FOR BARBECUE GRILL**

**Michael Giebel, Joplin; Steven Speck, and Randy Love, both of Neosho, all of Mo., assignors to Sunbeam Products, Inc., Ft. Lauderdale, Fla.**

**Filed Aug. 15, 1994, Ser. No. 290,428**
**Int. Cl.[6] A47J** *37/00*
**U.S. Cl. 126—41 R** **5 Claims**



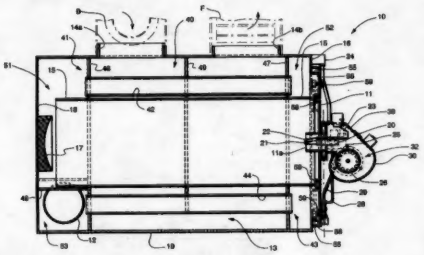
**1**. A side burner for a barbecue grill comprising: a base member for housing a burner unit, said base member defining at least one pair of linearly aligned first and second depressions; a lid connected to said base member; said lid being pivotal between a closed position in which said lid covers said burner unit and an open position in which said lid has been pivoted away from said burner unit to provide access thereto; and a grid connected to said lid, said grid comprising at least one foot member; said grid being movable from a first position to a second position wherein said grid is substantially centered above said burner unit when said lid is pivoted from said closed position to said open position and wherein said at least one foot member is disposed within said first depression of said at least one pair of depressions when said grid is in said first position and said at least one foot member is disposed within said second depression of said at least one pair of depressions when said grid is in said second position.

5,490,495

**CLEANOUT HEADER FOR MULTI OIL FURNACES**

**Beneul F. Smoker; David J. Yoder; Benjamin K. Smoker; Frederick W. Phillips, all of Leola, and Emanuel S. Beiler, Gordonville, all of Pa., assignors to Clean Burn, Inc., Leola, Pa.**

**Filed Apr. 14, 1994, Ser. No. 227,334**
**Int. Cl.[6] F24H** *3/06*
**U.S. Cl. 126—104 R** **21 Claims**



**1**. A multi oil furnace comprising:

an external cabinet shell having a door pivotally mounted thereon for covering a front opening for internal access to said cabinet shell, said door being movable between a closed position and an opened position and having a burner opening therethrough;

an elongated burner chamber supported within said cabinet shell in alignment with said burner opening for the burning of a flame therewithin to generate heat, said burner chamber being sealed against said door when in said closed position;

a burner assembly mounted on said front door and being operably coupled to means for providing a flow of air and a flow of used oil, said burner assembly being operable to ignite a combined flow of air and used oil to fire a flame through said burner opening into said burner chamber;

a heat exchanger supported within said cabinet shell to circulate exhaust gases from said burner chamber within said cabinet shell, said heat exchanger including first and second banks of conduits; and

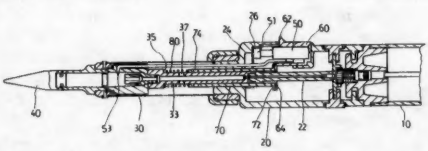
a front header adjacent said door and encircling said burner chamber for interconnecting said first and second banks of conduits in flow communication, said burner chamber extending through said front header such that said exhaust gases flowing through said front header from said first bank to said second bank must flow around said burner chamber.

5,490,496

**ELECTRIC IGNITION TYPE HANDY GAS TORCH**

**Arlo H. T. Lin, No. 5, Lane 25, Tatung Rd., Wu Fong Hsiang, Taichung, Taiwan, Prov. of China**

**Filed Feb. 17, 1995, Ser. No. 390,176**
**Int. Cl.[6] F23D** *14/62*
**U.S. Cl. 126—414** **4 Claims**



**1**. A gas torch comprising a cylindrical gas container, a barrel having a hollow projecting block, a gas tube disposed inside said barrel, a rotary gas-control knob connected between said gas container and said barrel and controlled to release fuel gas from said gas container into said gas tube, a welding tip, a cylindrical casing connected between said barrel and said welding tip remote from said gas container and having elongated air vents, a gas outlet

tube disposed inside said casing and connected to said gas tube and having a radial hole, an electronic ignition switch mounted within said hollow projecting block of said barrel and controlled to ignite fuel gas from said gas outlet tube for heating said welding tip, a cap mounted on said electronic ignition switch and arranged to be moved to switch on and off said electronic ignition switch and having a bottom coupling portion connected to said gas outlet tube, and a sliding sleeve mounted around said gas outlet tube and having a radial hole communicated with said air vents on said casing and arranged to be moved by said bottom coupling portion of said cap relative to the radial hole on said gas outlet tube, wherein when said cap is moved forward to switch on said electronic switch, said sliding sleeve is moved forward by said bottom coupling portion of said cap to align the radial hole on said sliding sleeve with the radial hole on said gas outlet tube, permitting fuel gas to be mixed with air for burning within said casing to heat said welding tip.

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**5,490,497**

## INHALATION DEVICES WITH A REDUCED RISK OF BLOCKAGE

**Kevan E. Chippendale, Stoke on Trent; John S. Corbett, Loughborough; John L. Hart, Bramcote, and Geraldine Walkley, Melton Mowbray, all of, England, assignors to Fisons plc, Ipswich, England**

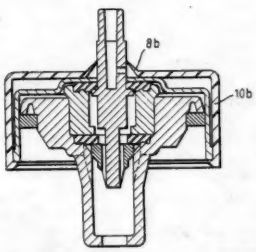
**Division of Ser. No. 958,449, Oct. 7, 1992, Pat. No. 5,349,944, which is a continuation of Ser. No. 487,963, Jul. 5, 1990, abandoned. This application May 18, 1994, Ser. No. 245,567**

**Claims priority, application United Kingdom, Mar. 28, 1988, 8806990; Mar. 28, 1988, 8806991; Aug. 9, 1988, 8818180; Sep. 10, 1988, 8821339**

**The portion of the term of this patent subsequent to Oct. 7, 2012, has been disclaimed.**

**Int. Cl.[6] A61M** *11/00*

**U.S. Cl. 128—200.14** **1 Claim**




1. A cap of elastomeric material for use in an aerosol inhalation device having a mouthpiece and a canister of pressurized hygroscopic medicament being fitted at one end with a dispensing metering valve having a valve stem provided with an inlet port and being moveable between an inoperative position in which such an inlet port is located outside such a metering valve and an operative position in which such an inlet port is located within the metering valve;

said cap being adapted to fit over an end of a canister fitted with a dispensing metering valve, and being provided with a frusto-conical central portion through which a valve stem passes and protrudes, such that in an inoperative position the cap shields an inlet port from a user's breath and upon movement between the inoperative position and an operative position the cap brushes a surface of a dispensing metering valve stem.

**5,490,498**

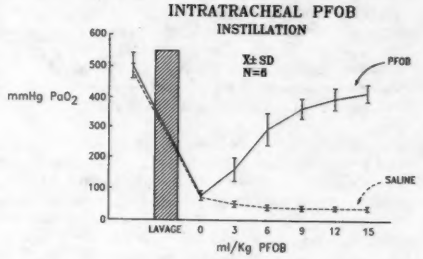
## PARTIAL LIQUID BREATHING OF FLUOROCARBONS

**Nicholas S. Faithfull, Normanton by Bottesford, England, and Jeffry G. Weers, San Diego, Calif., assignors to Alliance Pharmaceutical Corp., San Diego, Calif.**

**Continuation of Ser. No. 695,547, May 3, 1991, abandoned. This application Sep. 1, 1994, Ser. No. 299,884**

**Int. Cl.[6] A61M** *15/00*

**U.S. Cl. 128—203.12** **16 Claims**




1. A method for treating a patient in need of facilitated oxygen delivery through the lungs, additional lung surfactant, removal of material from the lung, or inflation of collapsed portions of the lung, comprising the steps of:

first introducing into the lung of the patient an effective therapeutic amount of a fluorocarbon liquid, said introduced amount being at least about 0.1% and less than 35% of the functional residual capacity of the lung of the patient upon exhalation taking into account any positive or negative end expiratory pressure applied to said patient's lung; and

then moving a breathing gas into and out of the patient's lung on top of said introduced fluorocarbon liquid separate and apart from said introducing step, so that said breathing gas physically admixes with and oxygenates said introduced amount of fluorocarbon liquid within the lung, whereby the patient is breathing a gas while the introduced amount of fluorocarbon liquid is in the lung.

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**5,490,499**

## REGULATION OF A PROPELLANT GAS FLOW

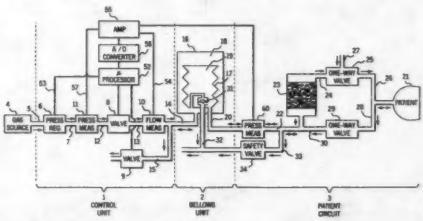
**Erkki Heinonen, and Markku Hyvönen, both of Helsinki, Finland, assignors to Instrumentarium Corp., Finland**

**Filed Feb. 18, 1993, Ser. No. 19,464**

**Claims priority, application Finland, Feb. 21, 1992, 920779**

**Int. Cl.[6] A61M** *16/00*

**U.S. Cl. 128—203.28** **18 Claims**




1. Apparatus for regulating the volume of a breathing gas delivered to a patient during an inhalation phase of a respiratory cycle, said respiratory cycle also having an expiration phase, said apparatus employing propellant gas from a propellant gas source and comprising:

a propellant gas chamber;

supply conduit means extending from the propellant gas source to said propellant gas chamber for providing a flow of propellant gas from the gas source to said propellant gas chamber;

discharge conduit means for discharging propellant gas from said propellant gas chamber;

a second gas chamber containing breathing gas and separated by a wall from said propellant gas chamber, said wall being movable responsive to the pressure of the propellant gas in said propellant gas chamber for altering the volume of said second gas chamber, said second gas chamber delivering breathing gas to the patient in the inhalation phase and receiving gas expired by the patient in the expiration phase as a result of the supply and discharge of propellant gas to and from the propellant gas chamber;

a controllable pressure regulator interposed in said supply conduit means and having an input connected to the propellant gas source and an output coupled to said propellant gas chamber for discharging gas at a pressure determined by the pressure regulating action of said controllable pressure regulator;

means interposed in said supply conduit means, said means sensing and responding to the flow of propellant gas through said supply conduit means for measuring a selected physical property of the flowing propellant gas indicative of the amount of gas delivered to said propellant gas chamber; and

control means coupled to said controllable pressure regulator and said measuring means for operating said controllable pressure regulator responsive to the measurement of said selected physical property to regulate propellant gas pressure to establish a desired propellant gas flow magnitude to the propellant gas chamber during the inhalation phase.

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**5,490,500**

## ANESTHETIC EVAPORATOR WITH INTERMEDIATE CONTAINER

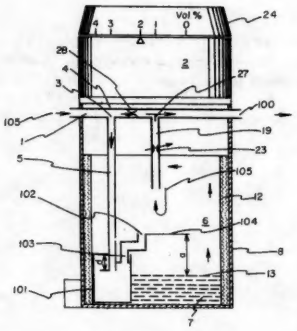
**Dirk-Stefan Reichert; Günther Hahmann, both of Lübeck, and Wolfgang Falb, Krummesse, all of, Germany, assignors to Drägerwerk AG, Lubeck, Germany**

**Filed Jun. 8, 1994, Ser. No. 255,653**

**Claims priority, application Germany, Jun. 24, 1993, 43 20 921.1**

**Int. Cl.[6] A61M** *16/00*

**U.S. Cl. 128—204.13** **16 Claims**




1. Anesthetic evaporator, comprising:

a housing defining an evaporation chamber containing a liquid anesthetic, said housing having a gas inlet and a gas outlet, said liquid anesthetic in said evaporation chamber defining a liquid level, said inlete having a point of separation;

a wick device extending into said evaporation chamber, said wick device being impregnated with said liquid anesthetic;

an evaporation chamber line connected to said gas inlet and extending from said point of separation into said evaporation chamber;

a bypass line connected to said gas inlet and extending from said point of separation to said outlet;

a return line connecting said bypass line to said evaporation chamber;

a flow regulating valve arranged in said return line;

adjusting means connected to said flow regulating valve for metering an amount of carrier gas enriched with anesthetic flowing from said evaporation chamber into said bypass line; and

an intermediate container forming an independent vessel within said evaporation chamber, at least one of said evaporation chamber line and said return line opening into said intermediate container, said intermediate container having a channel with a channel opening, said channel extending into said evaporation chamber from said intermediate container and communicating with an interior of said evaporation chamber whereby anesthetic which has penetrated into said intermediate chamber can be emptied.

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**5,490,501**

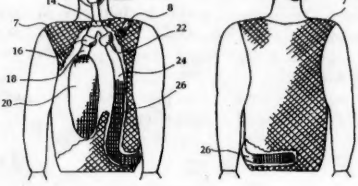
## AVALANCHE VICTIM'S AIR-FROM-SNOW BREATHING DEVICE

**Thomas J. Crowley, 11351 E. Amherst Ct., Aurora, Colo. 80014**

**Filed May 16, 1994, Ser. No. 243,237**

**Int. Cl.[6] A62B** *25/00*

**U.S. Cl. 128—204.17** **18 Claims**




1. An emergency breathing device for a person buried in snow, the snow having breathable air contained therein, comprising:

(a) an inhalation chamber;

(b) an inhalation membrane permeable by air but substantially impermeable by snow covering the inhalation chamber, the inhalation membrane preventing snow from entering the inhalation chamber, the inhalation membrane having a surface area sufficient to allow air to enter the inhalation chamber;

(c) an inhalation connecting tube having a lumen, the inhalation connecting tube connected to the inhalation chamber, wherein air is conveyed from the inhalation chamber through the lumen of the inhalation connecting tube;

(d) an inhalation check valve connected to the inhalation connecting tube, wherein the inhalation check valve permits air to flow from the lumen of the inhalation connecting tube through the inhalation check valve;

(e) a Y-shaped tubing connector having a mouthpiece connecting tube and arms, one arm of the Y-shaped tubing connector connected to the inhalation check valve, wherein air passes from the inhalation check valve to the mouthpiece connecting tube;

(f) an exhalation check valve connected to a remaining arm of the Y-shaped tubing connector, wherein the exhalation check valve permits air to flow from the mouthpiece connecting tube to the remaining arm of the Y-shaped tubing connector and through the exhalation check valve;

(g) an exhalation connecting tube having a lumen, the exhalation connecting tube connected to the exhalation check valve, wherein air is conveyed from the exhalation check valve to the lumen of the exhalation connecting tube;

(h) an exhalation chamber connected to the exhalation connecting tube; and

(i) an exhalation membrane permeable by air but substantially impermeable by snow covering the exhalation chamber, the exhalation membrane preventing snow from entering the exhalation chamber, the exhalation membrane having a surface area sufficient to pass air from the exhalation chamber;

whereby air trapped within snow burying a user is drawn through the inhalation membrane, inhalation chamber, inhalation connecting tube, inhalation check valve and to the mouthpiece connecting tube responsive to inhalation by the user, and whereby air exhaled by the user is conveyed through the mouthpiece connecting tube, exhalation check valve, exhalation connecting tube, exhalation chamber, exhalation membrane and into snow wherein exhaled air is not re-breathed by the user.

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**5,490,502**

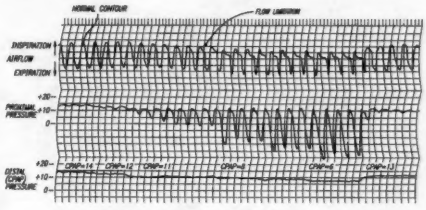
**METHOD AND APPARATUS FOR OPTIMIZING THE CONTINUOUS POSITIVE AIRWAY PRESSURE FOR TREATING OBSTRUCTIVE SLEEP APNEA**

**David M. Rapoport, New York, and Robert G. Norman, New Windsor, both of N.Y., assignors to New York University, New York, N.Y.**

**Continuation-in-part of Ser. No. 879,578, May 7, 1992, Pat. No. 5,335,654. This application May 20, 1994, Ser. No. 246,964**

**Int. Cl.[6] A61M** *16/00*

**U.S. Cl. 128—204.23** **36 Claims**




1. A method for optimizing the positive airway pressure to a patient, comprising the steps of:

a) applying an initial level of positive airway pressure of a breathing gas to a patient;

b) detecting the onset of an inspiratory flow of breathing gas to the patient;

c) storing data values representative of the inspiratory flow of breathing gas to the patient;

d) determining whether the stored data values indicate a flow limitation in the patient; and

e) increasing the positive airway pressure when the stored data values indicate a flow limitation in the patient.

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**5,490,503**

**SUCTION CATHETER HAVING MULTIPLE VALVES AND COLLET ASSEMBLY**

**William H. Hollister, East Sullivan, N.H., assignor to Smiths Industries Medical Systems, Inc., Keene, N.H.**

**Filed Apr. 29, 1994, Ser. No. 235,479**

**Int. Cl.[6] A61M** *25/01*

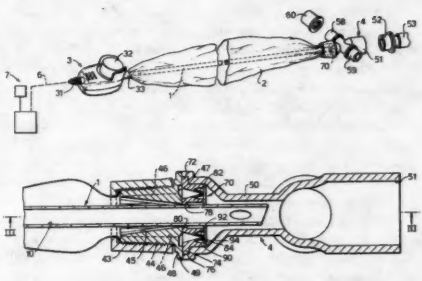
**U.S. Cl. 128—205.12** **5 Claims**

1. A suction catheter assembly for use in removing undesirable fluid from a patient, the catheter assembly comprising:

an aspirating catheter having a proximal end and a distal end, said distal end being suitable for insertion into a patient;

a vacuum connecting member located in the vicinity of said proximal end of said aspirating catheter;

a patient connecting member mounted to surround said aspirating catheter in the vicinity of said distal end of said aspirating catheter;



a protective sleeve surrounding at least the majority of the length of said catheter and extending between said vacuum connecting member and said patient connecting member, said protective sleeve being adapted to permit said distal end of the catheter to be extended from said protective sleeve into the patient and to be withdrawn from the patient; and

a one-piece integral valve assembly within said patient connecting member, said valve assembly comprising both a wiper seal for engaging the outside of said catheter and at least one one-way valve for permitting gas flow through the valve out of the interior of said sleeve and into said patient connecting member but preventing any substantial gas flow through said valve into said sleeve such that any gas trapped in said sleeve can escape into said patient connecting member through said one-way valve;

wherein said valve assembly includes a plurality of one-way valves formed integrally therewith.

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**5,490,504**

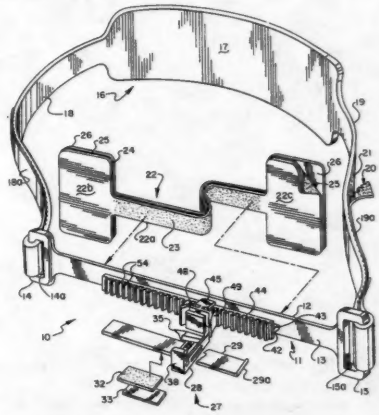
**ENDOTRACHEAL TUBE ATTACHMENT DEVICE**

**David W. Vrona; Michael R. Lavender, both of Vernon Hills; James J. Peterson, Island Lake, and Margo E. Love, Round Lake Beach, all of Ill., assignors to Hollister Inc., Libertyville, Ill.**

**Filed Jun. 21, 1994, Ser. No. 262,937**

**Int. Cl.[6] A61M** *25/01*

**U.S. Cl. 128—207.17** **10 Claims**



1. A device for securing an endotracheal tube to a patient and allowing selective lateral positioning and positive locking of the tube without removing the device or tube from the patient, said device comprising:

an elonqated strip of flexible material shaped to fit on a region adjacent to and along one lip of a patient, said strip having inner and outer surfaces and a pair of opposite ends;

adhesive pad means disposed on the inner surface of said strip for adhesively attaching the strip to said region of the patient;

a tube holder slidably connected to said strip and having an arm extending in a direction generally perpendicular to said strip, said tube holder including securement means for releasably attaching a tube along said arm;

positioning means for attaching said tube holder to said strip and allowing lateral sliding of said holder along a length of said strip; and

locking means for positively locking said holder in a selected position along the length of said strip, said locking means including restraining means disposed on said strip and engaging means disposed on said tube holder for selectively engaging or disenlarging said restraining means and respectively locking said tube holder in a selected position or allowing lateral sliding of said tube holder along said strip;

said positioning means comprising track means disposed along said outer surface of said strip for enabling said tube holder to be slidably mounted thereon, and shuttle means disposed on said tube holder for engaging said track means and allowing lateral sliding of said tube holder along said track means;

said track means comprising an elongated rail of generally T-shaped configuration having a first member extending from said outer surface of said strip and a second cross-member parallel to said strip, and said shuttle means comprising a retainer of generally C-shaped configuration disposed on said holder and adapted to receive said cross-member of said rail such that said retainer and said tube holder are laterally slidable along said rail.

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**5,490,505**

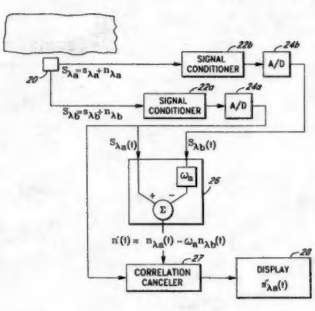
## SIGNAL PROCESSING APPARATUS

**Mohamed K. Diab; Esmaiel Kiani-Azarbayjany, both of Laguna Niguel, and Walter M. Weber, Dana Point, all of Calif., assignors to Masimo Corporation, Mission Viejo, Calif.**

**Continuation-in-part of Ser. No. 249,690, May 26, 1994, which is a continuation of Ser. No. 666,060, Mar. 7, 1991, abandoned. This application Oct. 6, 1993, Ser. No. 132,812**

**Int. Cl.[6] A61B** *5/00*

**U.S. Cl. 128—633** **24 Claims**




1. In combination:

a detector responsive to a first signal which travels along a first propagation path and a second signal which travels along a second propagation path, to provide a representation of said first and said second signals on an output, a portion of said first and second propagation paths being located in the same propagation medium, wherein said representation of said first signal on said output has a primary signal portion and a secondary signal portion, said primary signal portion of said first signal being subject to attenuation along substantially the entire first propagation path and wherein said representation of said second signal on said output has a primary signal portion and a secondary signal portion, said primary signal portion of said second signal being subject to attenuation along substantially the entire second propagation path; and

a first signal processor having inputs coupled to said detector, said first signal processor responsive to said representation of said first and second signals from said detector to combine said first and second signals to generate either a primary or secondary reference signal which is a function significantly of either of, respectively, said primary or said secondary signal portions of said first and second signals.

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**5,490,506**

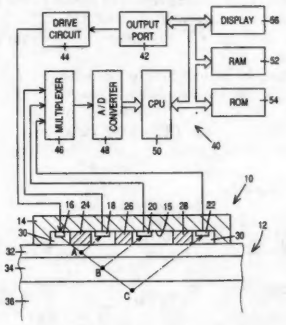
## PERIPHERAL BLOOD FLOW EVALUATING APPARATUS

**Setsuo Takatani, Houston, Tex., and Hiroshi Sakai, Komaki, Japan, assignors to Colin Corporation, Aichi, Japan**

**Filed Mar. 28, 1994, Ser. No. 218,811**

**Int. Cl.[6] A61B** *5/00*

**U.S. Cl. 128—633** **22 Claims**




1. An apparatus for evaluating a peripheral blood flow of a living subject, comprising:

a reflection-type pulse detecting device including at least two pairs of light-emitting and light-receiving means provided such that a distance between the light-emitting and light-receiving means of one of said at least two pairs is different from a distance between the light-emitting and light-receiving means of the other, or each of the others, of said at least two pairs, said at least two pairs of light-emitting and light-receiving means being adapted to be opposed to a skin of said subject, the light-emitting means of each one of said at least two pairs emitting a light beam having a wavelength equal to a wavelength of a light beam emitted by the light-emitting means of the other, or each of the others, of said at least two pairs toward said skin so that the light-receiving means of said each pair receives the light which has been emitted from said light-emitting means of said each pair and subsequently reflected from said skin, and generates a reflected-light signal representing the reflected light received from said skin and containing a pulse wave signal resulting from flowing of blood in said skin;

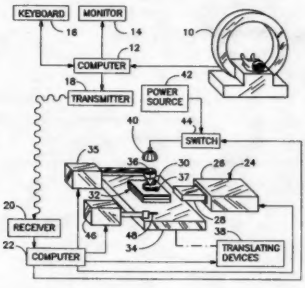
attenuation-coefficient determining means for determining an attenuation coefficient of the light beam emitted by said light-emitting means of said each pair, based on (a) an intensity of the light beam which is emitted by said light-emitting means of said each pair and (b) an intensity of the light beam which has been emitted from said light-emitting means of said each pair, reflected from said skin of said subject, and subsequently received by said light-receiving means of said each pair; and

peripheral-blood-flow evaluating means for evaluating said peripheral blood flow of said subject, based on a ratio of the attenuation coefficient of the light beam emitted by the light-emitting means of one of said at least two pairs, to the attenuation coefficient of the light beam emitted by the light-emitting means of the other or another of said at least two pairs.

## 5,490,507
## METHOD AND APPARATUS FOR GENERATING PELVIC MODEL

**Peter J. Wilk, 185 W. End Ave., New York, N.Y. 10023, and Mitchell N. Essig, 227 High Brook Ct., Pelham, N.Y. 10803**

**Filed Feb. 23, 1994, Ser. No. 200,752**
**Int. Cl.[6] A61B** *5/055;6/03;17/42;* **G09B** *23/30*
**U.S. Cl. 128—653.1** **20 Claims**




**1**. A method for use in medical diagnosis and treatment, comprising the steps of:

scanning a female patient in a pelvic region to obtain electrically encoded data specifying the patient's pelvic structure;

in accordance with said electrically encoded data, depositing a hardenable opaque liquid substance on a series of transparent sheets such that, upon a stacking of said sheets and a hardening of said liquid substance, a three-dimensional model of the patient's pelvic structure is generated;

subjecting said liquid substance, upon deposition thereof on said sheets, to an energy tending to cure said liquid substance;

stacking said sheets; and

bonding said sheets to one another to form a substantially unitary body incorporating said model.

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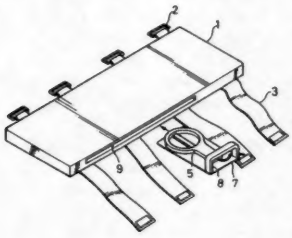
## 5,490,508
## MAGNETIC RESONANCE IMAGING DIAGNOSIS APPARATUS HAVING MAT FOR USE WITH SMALL BODY

**Yutaka Kato, Tochigiken, Japan, assignor to Kabushiki Kaisha Toshiba, Kanagawa, Japan**

**Filed Feb. 16, 1994, Ser. No. 198,234**
**Claims priority, application Japan, Feb. 19, 1993, 5-030544**
**Int. Cl.[6] A61B** *5/055*
**U.S. Cl. 128—653.5** **4 Claims**



**1**. In a magnetic resonance imaging diagnosis apparatus having means for generating magnetic and gradient fields in a space and radio frequency coil means for receiving nuclear magnetic resonance signals from said space, and means for providing an image using the nuclear magnetic resonance signals received from the radio frequency coil means, wherein the improvement comprises:

a gantry for enclosing the space;

a tabletop which is slidably insertable into said space enclosed by said gantry;

a mat having a length dimension and a width dimension with the length dimension greater than the width dimension and a slot therein in the length dimension, the mat being provided above the tabletop; and

wherein the radio frequency coil means is slidably inserted in the slot of the mat so that a position of the coil means relative to the mat in a direction substantially parallel to the length dimension of the mat can be accurately observed and aligned.

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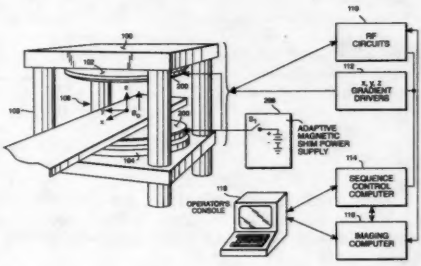
## 5,490,509
## METHOD AND APPARATUS FOR MRI USING SELECTIVELY SHAPED IMAGE VOLUME OF HOMOGENEOUS NMR POLARIZING FIELD

**Joseph W. Carlson, Kensington, and Leon Kaufman, San Francisco, both of Calif., assignors to The Regents of the University of California, Oakland, Calif.**

**Filed Mar. 18, 1993, Ser. No. 33,552**
**Int. Cl.[6] A61B** *5/055*
**U.S. Cl. 128—653.2** **20 Claims**




**1**. A method of performing MRI, said method comprising the steps of:

(a) temporarily altering a dimension of a volume in which there is provided a substantially homogeneous NMR polarizing field so as to reduce the volume of the homogeneous NMR polarizing field in a first direction while simultaneously increasing it in a second different direction; and

(b) performing MRI to acquire image data for objects located within said volume of altered dimension.

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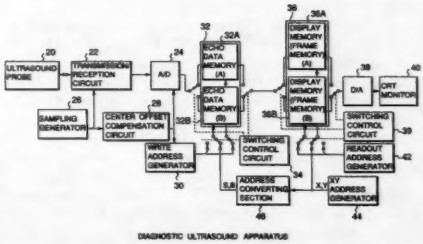
## 5,490,510
## DIAGNOSTIC ULTRASOUND APPARATUS

**Kazuhiro Shiro, Tokyo, Japan, assignor to Aloka Co., Ltd., Japan**

**Filed Apr. 18, 1995, Ser. No. 424,040**
**Int. Cl.[6] A61B** *8/00*
**U.S. Cl. 128—660.07** **18 Claims**




DIAGNOSTIC ULTRASOUND APPARATUS

**1**. A diagnostic ultrasound apparatus, comprising:

an ultrasound probe for transmitting and receiving ultrasound waves to and from a patient to obtain echo data of the patient;

a first memory means in which said echo data are to be written by being identified with addresses represented by a polar coordinate system;

a second memory means in which said echo data read out from said first memory means are to be written according to first addresses represented by a rectangular coordinate system;

means for sequentially generating said first rectangular coordinate addresses, said first rectangular coordinate addresses being used when said echo data are written into said second memory means; and

address converting means for converting said first rectangular coordinate addresses generated by said address generating means into said polar coordinate addresses, said address conversion being carried out based upon addresses of a representative quadrant which is one of a plurality of quadrants of a second rectangular coordinate system which is obtained by converting said first rectangular coordinate system so as to correspond to said polar coordinate system, in which said plurality of quadrants of said second rectangular coordinate system correspond to a plurality of quadrant of said polar coordinate system, and quadrant discriminating information which discriminates which of said plurality of quadrants said representative quadrant belongs to;

whereby said echo data are read out from said first memory means in accordance with said converted polar coordinate addresses which are supplied from said address converting means, and thus read out echo data are written into said second memory means.

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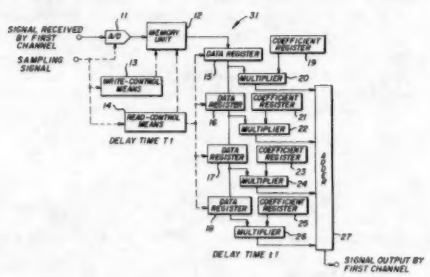
**5,490,511**

## DIGITAL PHASE SHIFTING APPARATUS

**Shinichi Amemiya, and Yoichi Suzuki, both of Tokyo, Japan, assignors to GE Yokogawa Medical Systems, Ltd, Tokyo, Japan**

**Filed Jun. 27, 1994, Ser. No. 302,710**
**Int. Cl.[6] A61B *8/00***
**U.S. Cl. 128—660.01** **4 Claims**




1. A digital phase shifting apparatus comprising:

sampling signal generating means for generating sampling signals at selected time intervals;

means for sampling analog input signals at sampling time intervals provided by said sampling signal generating means and for generating a time-axis train of sampled data therefrom;

memory means for storing the time-axis train of sampled data one after another sampled at fixed sampling intervals at addresses corresponding to sampling times;

read means for reading out data sampled at times ahead of a current sampling time by desired time differences from said memory means one after another in synchronization with sampling which provides said time-axis train of sampled data;

a plurality of register means for holding sampled data read out from said memory means, said sampled data being selected from a most recently read out data to a data ahead of the most recently read out data by a predetermined data count; and

interpolated data generating means for summing up a plurality of sampled data held in said plurality of register means with a weighted coefficient applied to each sampled data to generate interpolated data at a desired arbitrary point in time within sampling intervals of the sampled data held in said plurality of register means, wherein said interpolated data generating means comprises

a plurality of coefficient register means corresponding to said plurality of register means and for holding a predetermined weighted coefficient,

a plurality of multiplier means corresponding to said plurality of register means and to said plurality of coefficient register means, and for multiplying a sampled data from the corresponding register means with a weighted coefficient from the corresponding coefficient register means, and

an adder means for summing up outputs from said plurality of multiplier means.

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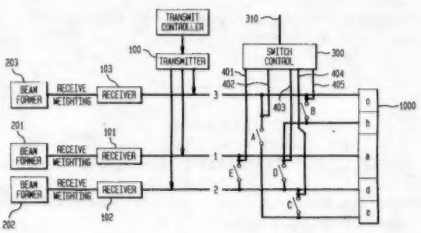
**5,490,512**

## ELEVATION DIRECTION FOCUSING IN ULTRASOUND TRANSDUCER ARRAYS

**Seojoong Kwon, Bellevue; Dong-Chyuan Liu, Mercer Island, both of Wash., and Bruce A. McDermott, Chapel Hill, N.C., assignors to Siemens Medical Systems, Inc., Iselin, N.J.**

**Filed Jun. 16, 1994, Ser. No. 260,645**
**Int. Cl.[6] A61B *8/00***
**U.S. Cl. 128—661.01** **14 Claims**




1. An ultrasonic imaging apparatus for transmitting ultrasonic signals to a subject to be diagnosed and for reconstructing an ultrasonic diagnostic image from received ultrasonic echo signals, the ultrasound imaging apparatus comprising:

a plurality of transducer elements two-dimensionally oriented to define multiple rows and multiple columns of transducer elements, transducer elements oriented along a lateral direction to define the multiple rows, transducer elements oriented along the elevation direction to define the multiple columns, the transducer elements converting electrical driving signals supplied thereto into ultrasonic transmitting signals and converting the ultrasonic echo signals into electrical echo signals;

means for generating a first electrical driving signal and a second electronic driving signal, the first and second electrical driving signal having differing voltage levels; and

means for selectively coupling the first electrical driving signal to a first one or more transducer elements in a first column and the second electrical driving signal to a second one or more transducer elements in the first column, the first one or more transducer elements and second one or more transducer elements being mutually exclusive.

**5,490,513**

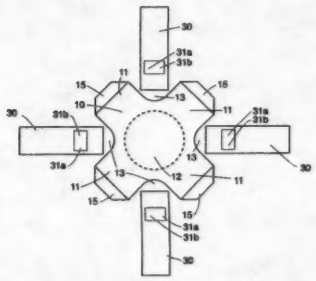
## MULTIPLE PATIENT BREAST SCANNING ON A MAGNETIC RESONANCE IMAGING APPARATUS

**Raymond V. Damadian, Woodbury, and Jan Votruba, Elmont, both of N.Y., assignors to Fonar Corporation, Melville, N.Y.**

**Continuation-in-part of Ser. No. 952,327, Sep. 28, 1992. This application Oct. 4, 1993, Ser. No. 131,124**

**Int. Cl.[6] A61B** *5/055*

**U.S. Cl. 128—653.2** **12 Claims**




**1**. A method of conducting a magnetic resonance imaging procedure on the breast region of successive patients using a magnetic resonance imaging apparatus with at least two apertures providing access to an imaging volume and with at least two patient handling systems, comprising:

(a) loading a first patient onto a breast positioning device located on a movable bed structure of one of said patient handling systems;

(b) moving said first patient into one of said apertures;

(c) positioning the breast region of said first patient in said imaging volume such that radio frequency antennas are properly positioned relative to the breast region of said first patient;

(d) performing a magnetic resonance scan protocol on the breast region of said first patient;

(e) loading a second patient onto a breast positioning device placed on a movable bed structure of a second of said patient handling systems while conducting said magnetic resonance scan protocol on the breast region of said first patient;

(f) removing said first patient from said imaging volume through said aperture following completion of said magnetic resonance scan protocol on the breast region of said first patient;

(g) moving said second patient into a second of said apertures;

(h) positioning said second patient in said imaging volume such that the radio frequency antennas are properly positioned relative to the breast region of said second patient;

(i) performing a magnetic resonance scan protocol on the breast region of aid second patient;

(j) removing said second patient from said imaging volume following completion of a magnetic resonance scan protocol on the breast region of said second patient.

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**5,490,514**

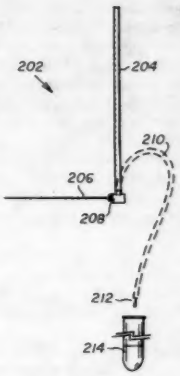
## MEDICAL MANOMETER WITH FLEXIBLE FLUID COLLECTION TUBE

**Norman M. Rosenberg, 11122 Alford, Brighton, Mich. 48116**

**Filed Nov. 3, 1994, Ser. No. 333,817**

**Int. Cl.[6] A61B** *5/00*

**U.S. Cl. 428—674** **2 Claims**




**1**. A method of measuring spinal fluid pressure comprising the steps of:

a) inserting a needle into a patient's epidural cavity, the needle being in fluid communication with a first end of a flexible, valveless tube, the flexible, valveless tube having a second end which is open to the air, the tube bearing graduation indicia along at least part of its length and having at least a portion of its circumference in the graduation-bearing region at least translucent,

b) bending the tube so that a portion of the tube is in a vertical position with the open end pointing generally upward so that spinal fluid enters the tube and rises within it,

c) reading the spinal pressure indication by visually comparing the level of fluid in the tube with the graduation indicia, and

d) bending the tube to lower the open end of the tube so that the fluid drains out of the tube.

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**5,490,515**

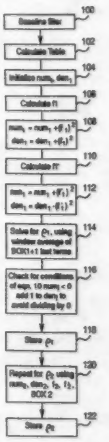
## FILTER APPARATUS AND METHOD FOR REDUCING SIGNAL NOISE USING A PLURALITY OF SIGNALS OBTAINED FROM A SIGNAL SOURCE

**David W. Mortara, River Hills, Wis., assignor to Mortara Instrument, Inc., Milwaukee, Wis.**

**Continuation of Ser. No. 71,337, Jun. 2, 1993, Pat. No. 5,421,342, which is a continuation of Ser. No. 643,719, Jan. 18, 1991, abandoned. This application Aug. 29, 1994, Ser. No. 297,496**

**Int. Cl.[6] A61B** *5/0428*

**U.S. Cl. 128—696** **39 Claims**




**1**. A method for providing an output signal corresponding to a signal produced by a signal source, the signal produced by the signal source having a series of repetitious, generally similar

features, said method reducing the presence of noise in the provided output signal and comprising the steps of:

sequentially sensing a plurality of said repetitious signal features to obtain a plurality of received signals in which noise may be present, each of said plurality of received signals corresponding to one of said repetitious signal features;

forming at least one set of determination points in the plurality of received signals;

measuring the actual magnitude of said received signals at the determination points;

selecting a given one of the received signal as that for which a corresponding output signal having reduced noise will be produced;

generating, from the actual magnitudes of the received signals other than the given received signal, an estimated signal representing an estimated magnitude of the given received signal for at least one determination point in the given received signal;

comparing the given received signal and the estimated signal on the basis of their magnitudinal properties;

generating a compliance signal from said comparison of the given received signal and estimated signal indicative of the compliance between the signals, differences in the given received signal and estimated signal being attributable to noise in the given received signal; and

generating, from the given received signal and the compliance signal, said output signal in which the presence of noise is reduced.

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**5,490,516**

## METHOD AND SYSTEM TO ENHANCE MEDICAL SIGNALS FOR REAL-TIME ANALYSIS AND HIGH-RESOLUTION DISPLAY

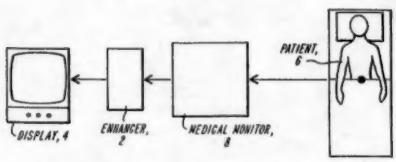
**William H. Hutson, 47 Grange Ave., P.O. Box 0221, Little Compton, R.I. 02837**

**Continuation-in-part of Ser. No. 991,291, Dec. 15, 1992, Pat. No. 5,348,020, which is a continuation-in-part of Ser. No. 978,245, Nov. 18, 1992, Pat. No. 5,245,587, which is a continuation-in-part of Ser. No. 628,337, Dec. 14, 1990, Pat. No. 5,175,710. This application May 6, 1993, Ser. No. 58,571**

**The portion of the term of this patent subsequent to Sep. 20, 2011, has been disclaimed.**

**Int. Cl.[6] A61B** *5/0402*

**U.S. Cl. 128—696** **50 Claims**




1. A method of enhancing medical signals received from a monitoring device comprising the steps of:

inputting medical signals:

extracting data from said medical signals;

embedding said data into a data matrix;

compressing said data matrix into a compressed-data-form;

formatting a portion of said compressed-data-form into at least one auto-correlation matrix;

determining the structural characteristics of each said autocorrelation matrix;

filtering said compressed-data-form based on said structural characteristics to form a filtered compressed-data-form; and

expanding selected data values in said filtered compressed-data-form to result in enhanced data.

**5,490,517**

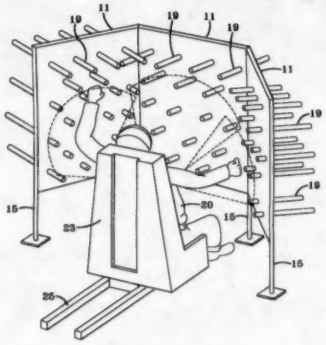
## OCCUPANT REACH AND MOBILITY APPARATUS

**Gary R. Whitman, Jamison, and David A. Rose, Holland, both of Pa., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed Apr. 12, 1994, Ser. No. 226,517**

**Int. Cl.[6] A61B** *5/00*

**U.S. Cl. 128—774** **8 Claims**




1. An aircrew field of view measurement device for evaluating a subject's crew person rearward vision related to equipment located within actual cockpit structures each having known dimensions and each having a rearward structure and an aircraft cockpit located therein, said measurement device comprising:

a plurality of vertical panels each located a predetermined distance behind said subject crew person and arranged in a semi-circle, the predetermined distances between said subject and said panels approximating the distances between said subject and said equipment within said actual cockpit structures; and

a plurality of indicia on said panels, said indicia being arranged along a horizontal line across each of said panels and being sighted by said subject crew person turning his/her head so that said indicia is within said subject's crew person rearward vision.

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**5,490,518**

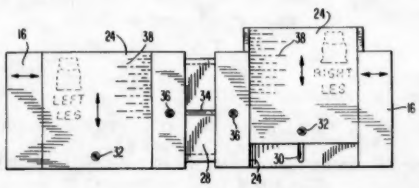
## LEG LENGTH ANALYZER

**Roger Russo, 6 Oak Ridge Ct., Pomona, N.Y. 10970, and Paul Lauro, Nanuet, N.Y., assignors to Roger Russo, Pomona, N.Y.**

**Filed Jan. 17, 1995, Ser. No. 372,965**

**Int. Cl.[6] A61B** *5/103*

**U.S. Cl. 128—774** **5 Claims**




1. A leg length analyzer tool for measuring differences in a patient's leg lengths comprising a generally solid rectangular structure having end surfaces, an upper surface and a lower surface, said upper surface defining a pair of separated cross-slots, a pair of cross-slabs for slidable engagement each with one of said cross-slots, each of said slabs being a generally solid rectangular shape having a top surface defining indicia for measuring, said lower

surface defining a lengthwise slot generally perpendicular to each of said cross-slots, and a lengthwise, generally solid rectangular slab having a top surface, for slidable engagement with said lengthwise slot in order to further separate said cross-slots to accommodate the physicality of said patient, all adapted and arranged for measuring a difference in a patient's leg lengths by placing one of said cross-slabs to abut the end of the patient's longer leg, moving the other of said cross-slabs so that it extends from its cross-slot to abut the end of the patient's shorter leg, whereby the said indicia of said other cross-slab indicates a measurement of said difference.

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**5,490,519**

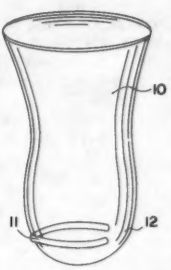
## TUBULAR PROTECTIVE DEVICE FOR PROTECTION AGAINST TRANSFER OF INFECTIOUS MATTER DURING SEXUAL INTERCOURSE

**Lasse Hessel, Reading, England, assignor to Chartex International plc, London, United Kingdom**

**Continuation of Ser. No. 210,076, Feb. 24, 1994, abandoned, which is a continuation of Ser. No. 27,842, Mar. 8, 1993, abandoned, which is a continuation of Ser. No. 727,637, Jul. 10, 1991, abandoned, which is a continuation-in-part of Ser. No. 621,850, Dec. 4, 1990, Pat. No. 5,094,250, which is a continuation of Ser. No. 148,992, Jan. 27, 1988, Pat. No. 4,976,273, which is a continuation of Ser. No. 58,766, Jun. 5, 1987, Pat. No. 4,735,621. This application Nov. 16, 1994, Ser. No. 341,138**

**Int. Cl.**[6] **A61F** *6/02;6/04*

**U.S. Cl. 128—842** **2 Claims**




1. A tubular protective device for protection against a transfer of infectious matter during sexual intercourse consisting of:

(a) a flexible, thin-walled tube having a continuous thickness between 20 and 60 microns and having a closed end and an open end, said open end having a ring integrally affixed at said open end; and

(b) a means for retaining at said closed end of said flexible, thin-walled tube, said means for retaining is at least one crescent-shaped member, said crescent-shaped member radially extends said closed end and maintains said closed end in a vagina of a user.

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**5,490,520**

## DENTAL APPLICANCE FOR TREATING BRUXISM

**Donald W. Schaefer, late of Madison, Wis., and Melvin P. Siedband, Madison, Wis., assignors to Schaefer Partnership, Eau Claire, Wis.**

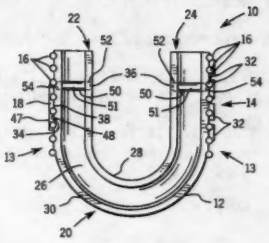
**Filed Sep. 27, 1993, Ser. No. 129,225**

**Int. Cl.**[6] **A61F** *5/56;* **A61C** *5/14*

**U.S. Cl. 128—848** **16 Claims**

1. A dental appliance for treating bruxism, comprising:

a mouthpiece configured to fit within the mouth of a wearer, the mouthpiece having a wall configured to receive a current source;




an electrode configured and disposed to contact an interior surface of the wearer's mouth when the mouthpiece is placed therein;

an electric circuit mounted to the mouthpiece, the electric circuit being configured to connect the current source and the electrode, wherein the electric circuit is configured to selectively provide current flow between the current source and the electrode when the wearer's upper and lower jaws are brought together with bruxing force; and

wherein said electric circuit comprises a sensor, disposed on the mouthpiece, for sensing the application of bruxing force.

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**5,490,521**

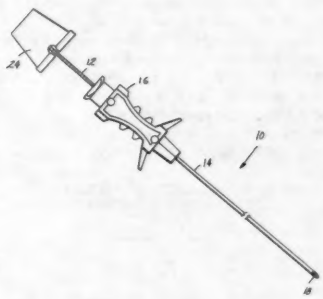
## ULTRASOUND BIOPSY NEEDLE

**Richard E. Davis, Grand Rapids, Mich., and Garey L. McLellan, Henderson, Nev., assignors to Medtronic, Inc., Minneapolis, Minn.**

**Continuation of Ser. No. 115,155, Aug. 31, 1993, abandoned. This application Aug. 16, 1994, Ser. No. 291,342**

**Int. Cl.**[6] **A61B** *8/12*

**U.S. Cl. 128—662.02** **23 Claims**




1. An echogenic medical needle comprising a tubular cannula body having a distal end and a proximal end, a stylet having a distal end and a proximal end, the stylet being received within the cannula body, and an echogenicity enhancement formed on one of the stylet and cannula body intermediate the proximal and distal ends thereof, the echogenicity enhancement comprising an annular series of contoured elements immediately adjacent one another and repetitively provided on said one of the stylet and cannula body and a series of longitudinal grooves in the surface said one of the stylet and cannula body, the contoured elements being adapted to reflect ultrasonic waves at a characteristic different from the other of the stylet and cannula.

**5,490,522**

## DEVICE FOR LOCATING AND PUNCTURING BLOOD VESSELS

**Eric Dardel, Forrenbergstrasse 22b, CH-8472 Seuzach, Switzerland**

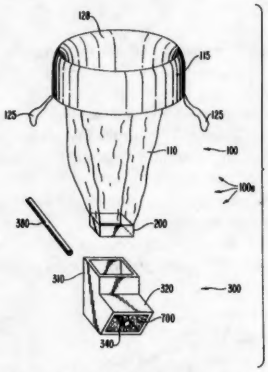
**PCT No. PCT/CH94/00007, § 371 Date Sep. 19, 1994, § 102(e) Date Sep. 19, 1994, PCT Pub. No. WO94/15532, PCT Pub. Date Jun. 21, 1994**

**PCT Filed Jan. 14, 1994, Ser. No. 307,563**

**Claims priority, application Switzerland, Jan. 18, 1993, 00127/93; Jul. 12, 1993, 02084/93**

**Int. Cl.[6] A61B** *8/12*

**U.S. Cl. 128—662.05** **22 Claims**




1. A device for sterile packing of at least part of an ultrasonic Doppler unit wherein the Doppler unit includes a non-sterile probe having an ultrasonic wave transmission axis, an electronic unit and a cable electrically interconnecting the probe and the electronic unit, the probe having an axial slot with a slot bottom for positioning a hypodermic needle parallel to and substantially coaxial with the axis of ultrasonic waves emitted by the probe, the device comprising the combination of:

a cap having a non-sterile interior volume for receiving at least the distal end of the probe and a sterile exterior surface for facing toward a patient's skin;

a guide tube penetrating said cap from one side to the other side having a sterile interior surface for receiving the hypodermic needle, said guide tube being dimensioned to enter said axial slot and lie at said slot bottom when said distal end of said probe is inserted into said cap; and

an exteriorly sterile packaging element for receiving at least said cable of said Doppler unit, said packaging element being attached to said cap and having a closable opening through which said probe and at least part of said cable is insertable.

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**5,490,523**

## FINGER CLIP PULSE OXIMETER

**Philip O. Isaacson, Chanhassen; David W. Gadtke, Plymouth, and Timothy L. Johnson, Medina, all of Minn., assignors to Nonin Medical Inc., Plymouth, Minn.**

**Filed Jun. 29, 1994, Ser. No. 268,202**

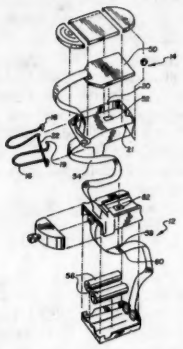
**Int. Cl.[6] A61B** *5/00*

**U.S. Cl. 128—633** **11 Claims**

1. Apparatus for measuring the blood oxygen saturation of arterial blood inside a body portion, comprising:

gripping means for releasably gripping a body portion, wherein the gripping means is comprised of finger gripping means for releasably gripping a finger;

a pulse oximeter means for sensing and determining the blood oxygen saturation of the arterial blood inside the gripped body portion, the pulse oximeter means being completely carried by the gripping means;




a display means for displaying the sensed and determined physical parameter, the display means being attached to the gripping means;

power means for providing power to the pulse oximeter means and the display means; and

program means operatively connected to the pulse oximeter means and display means for sensing the presence of a finger and switching the apparatus from a low power state to a normal power state.

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**5,490,524**

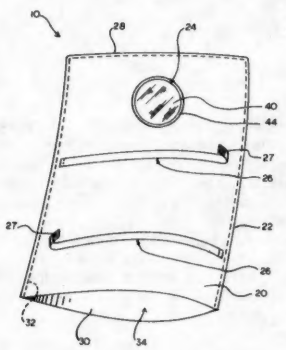
## SURGICAL DRAPE FOR A LASER TARGETING DEVICE USED WITH AN X-RAY MACHINE

**Terry N. Williams, 2032 Thorpshire Dr., Raleigh, N.C. 27615, and George R. Parrish, 815-12 Marlowe Rd., Raleigh, N.C. 27609**

**Filed Mar. 20, 1995, Ser. No. 407,332**

**Int. Cl.[6] A61B** *19/00;19/08*

**U.S. Cl. 128—849** **15 Claims**




1. A surgical drape for use with an x-ray machine having a laser targeting device mounted thereon, comprising:

a) a flexible, x-ray transparent sheet material adapted to cover a portion of the x-ray machine on which the laser targeting device is mounted;

b) an opening formed in the sheet material;

c) a transparent window bonded to the sheet material and overlying the opening in the sheet material, said transparent window being made of a material which permits unimpeded transmission of a laser beam through the transparent window; and

d) a colored locating means for indicating the location of said transparent window.

**5,490,525**

## PROPHYLACTIC DEVICE

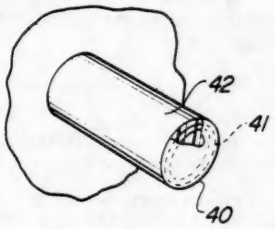
**Alla V. K. Reddy, 1042 Jade Dr., Hanna, Wyo. 82327**

**Continuation of Ser. No. 617,002, Nov. 21, 1990, Pat. No. 5,168,881, which is a division of Ser. No. 343,497, Apr. 24, 1989, Pat. No. 4,993,433, which is a continuation of Ser. No. 205,933, Jun. 13, 1988, Pat. No. 4,834,113, which is a continuation-in-part of Ser. No. 84,622, Aug. 11, 1987, abandoned, which is a continuation-in-part of Ser. No. 7,104, Jan. 27, 1987, abandoned. This application Nov. 24, 1992, Ser. No. 981,080**

**The portion of the term of this patent subsequent to Dec. 8, 2009, has been disclaimed.**

**Int. Cl.**[6] **A61F** *6/02*

**U.S. Cl. 128—842** **50 Claims**




1. A prophylactic device which is adapted to be worn by a person to prevent the transmission of disease and sperm during sexual intercourse, said device comprising:

(a) an elongated hollow pouch having first and second ends; said elongated hollow pouch having a length that covers substantially the full length of a vaginal tract; wherein said first end is closed and said second end includes an opening and wherein said pouch includes a thin wall member which is flexible;

(b) a continuous flange member which is attached to said second end of said pouch and which extends around the circumference of said opening;

(c) a retention member at said first end of said pouch comprising a ring shaped spring circumferentially enclosed by said first end of said pouch to apply radially outwardly directed pressure on said first end to engage the wall of the vagina.

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**5,490,526**

## APPARATUS FOR APPLYING AIR PRESSURE TO A ROD-SHAPED ARTICLE THROUGH WHICH AIR CAN BE CIRCULATED

**Takayuki Irikura, Tokyo, Japan, assignor to Japan Tobacco Inc., Tokyo, Japan**

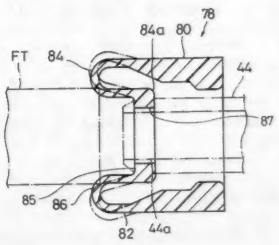
**Continuation of Ser. No. 110,938, Aug. 24, 1993, abandoned. This application Dec. 6, 1994, Ser. No. 343,896**

**Claims priority, application Japan, Aug. 24, 1992, 4-224147**

**Int. Cl.**[6] **A24C** *5/00;5/60*

**U.S. Cl. 131—280** **10 Claims**

1. An apparatus for applying air pressure to a rod-shaped article through which air can be circulated, comprising:




transportation means for transporting a rod-shaped article having two opposite ends, said transportation means including a transportation path along which the rod-shaped article is transported in a direction generally perpendicular to the axial direction thereof;

holding means for holding the opposite ends of the rod-shaped article as the rod-shaped article is transported on the transportation path, said holding means including a pair of pads arranged on either side of the transportation path, each pad having a pad face directed to the transportation path and an elastically deformable, ring-shaped bulging portion provided on the pad face when the rod-shaped article is passing through a predetermined region of the transportation path and being adapted to be pressed against the corresponding end face of the rod-shaped article so that the ring-shaped bulging portions is elastically spread out by the peripheral edge of the corresponding end face when the rod-shaped article reaches the predetermined region, the ring-shaped bulging portion having an outer face with a rounded convex shape, the outer face of the bulging portion facing the transportation path and embracing the peripheral edge of the corresponding end face of the rod-shaped article; and

input-output means for applying an input air pressure to one end of the rod-shaped article through one of the pads and for taking out an output air pressure appearing at the other end of the rod-shaped article through the other pad when the rod-shaped article is held between the paired pads.

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**5,490,527**

## APPARATUS FOR SAMPLING FILTER CIGARETTES DURING THE MANUFACTURER THEREOF

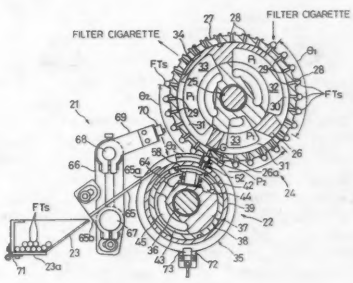
**Takayuki Irikura, and Makoto Kakiuchi, both of Tokyo, Japan, assignors to Japan Tobacco Inc., Tokyo, Japan**

**Continuation of Ser. No. 110,941, Aug. 24, 1993, abandoned. This application Nov. 29, 1994, Ser. No. 350,008**

**Claims priority, application Japan, Aug. 24, 1992, 4-224145**

**Int. Cl.**[6] **A24C** *5/60*

**U.S. Cl. 131—280** **9 Claims**




4. An apparatus for sampling manufactured filter cigarettes from a conveyor line thereof, the conveyor line transporting the filter cigarettes, said apparatus comprising:

a transportation drum including a drum shell having a plurality of suction grooves rotatably located in the conveyor line, said transportation drum transporting received filter cigarettes while attracting the filter cigarettes under a first suction pressure;

a sampling drum rotatably arranged in the vicinity of said transportation drum, said sampling drum having a sampling groove capable of periodically approaching one of the filter cigarettes transported on said transportation drum to receive the filter cigarette while said sampling drum is rotating;

supply means for supplying a second suction pressure to the sampling groove as the sampling groove passes a predetermined rotational angle zone on the side of said transportation

drum while said sampling drum is rotating, said supply means including a suction channel defined in said sampling drum and connected to the sampling groove;

suction pressure reducing means for reducing the first suction pressure on said transportation drum to a third suction pressure when the filter cigarette on said transportation drum passes over said sampling drum so that a differential pressure between the third suction pressure and the second suction pressure in the sampling groove is produced, said suction pressure reducing means including a suction chamber defined in said transportation drum and supplied with the first suction pressure and a throttle wall disposed inside of said drum shell of the transportation drum so as to define a gap which forms a communication between the suction chamber and a suction groove of the drum shell in order to produce the third suction pressure, and the filter cigarette on said transportation drum being attracted and received by the sampling groove on the basis of the differential pressure;

release means for removing the second suction pressure in the sampling groove after the rotational angle zone is passed by the sampling groove; and

collecting means for collecting the filter cigarette in the sampling groove from said sampling drum after the second suction pressure in the sampling groove is removed.

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**5,490,528**

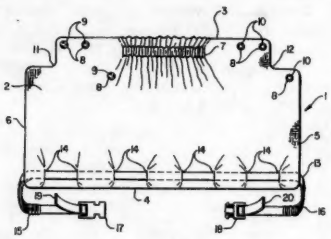
**FITTED HAIR TOWEL**

**Scott A. Day, 14277 Preston Rd., Suite 1022, Dallas, Tex. 75240**

**Filed Jun. 17, 1994, Ser. No. 261,835**

**Int. Cl.[6] A45D** *20/00*

**U.S. Cl. 132—200** **18 Claims**



**1**. A fitted hair towel for use on a head comprising:

an absorbent towel member having a top edge, a bottom edge and two side edges;

a plurality of fasteners attached to said towel member at opposed locations adjacent to said top edge;

a strap member attached to said towel member adjacent to said bottom edge and configured to secure said towel member in place in a wrapped configuration; and

an expandable gathering member attached to said towel member adjacent to said top edge such that said expandable gathering member conforms snugly to said head.

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**5,490,529**

**BRUSH WITH BRISTLES FIXED BETWEEN TWISTED SEGMENTS OF WIRE**

**Holger Fitjer, Ansbach, Germany, assignor to Georg Karl Geka-Brush GmbH, Bechhofen-Waizendorf, Germany**

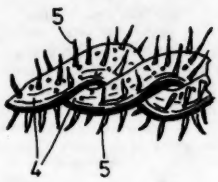
**Filed Jan. 18, 1994, Ser. No. 182,557**

**Claims priority, application Germany, Feb. 27, 1993, 43 06 214.8**

**Int. Cl.[6] A45D** *40/26*

**U.S. Cl. 132—218** **9 Claims**

**1**. A mascara brush comprising a plurality of twisted wire segments (**1**) engaged together, each of the wire segments (**1**) being



surrounded by a plastic coating, wherein the plastic coating consists of a open-cell, foamed material (**4**) formed with a plurality of pores per linear inch which absorb a liquid having a suspension of pigment particles.

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**5,490,530**

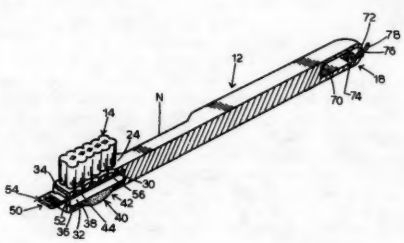
**DISPOSABLE TOOTHCARE ASSEMBLY**

**Patricia Snowden, 3003 Windchase Apt. 706, Houston, Tex. 77082**

**Filed May 3, 1994, Ser. No. 237,295**

**Int. Cl.[6] A46B** *11/02*

**U.S. Cl. 132—311** **7 Claims**



**1**. A disposable toothcare assembly comprising:

A) a handle having a forward end with a top surface, a bottom surface and sides, and a rear end;

B) a multiplicity of tooth brushing bristles mounted on said handle adjacent to said forward end, said bristles being arranged in groups, with said groups being spaced apart from each other at their bases;

C) a chamber for containing toothpaste defined in said handle adjacent to said forward end and beneath said bristles;

D) means for dispensing toothpaste to said bristles including

(1) a plurality of dispensing holes defined through said handle and connecting said top surface adjacent to said bristles to said chamber, said holes being located between said groups of bristles,

(2) a flexible diaphragm means connected to said handle adjacent to said chamber and extending out of said chamber through said handle for storing toothpaste and for applying pressure to said chamber when pushed into said chamber and for forcing toothpaste out of said chamber through said dispensing holes, said diaphragm means including an opening defined in said bottom surface and a flexible cover attached to said handle adjacent to said opening and extending out of said opening, said flexible cover being biased outwardly of said opening and being forced toward said top surface by a user to force toothpaste out of said chamber via said dispensing holes, and

(3) chamber closure means for closing said chamber and including a tab-receiving hole defined in said handle through said forward end and connecting to said chamber and a tab slidably received in said tab-receiving hole, said tab including

(i) a body section located in said handle between said chamber and said dispensing holes to close said holes and prevent toothpaste from moving from said chamber into said holes when said tab is in a chamber closing position, and

(ii) a means located outside of said chamber in front of said forward end for moving said tab between said chamber closing position and a chamber uncovering position with said body moved out of said chamber for uncovering said dispensing holes and permitting toothpaste to flow from said chamber into said dispensing holes;

E) a dental floss storage chamber defined in said handle adjacent to said rear end;

F) a dental floss dispensing hole defined through said handle in said rear end;

G) a spool of dental floss mounted in said dental floss storage chamber and having one end of the dental floss extending through said dental floss dispensing hole out of said dental floss storage chamber; and

H) cutting means mounted on said handle rear end adjacent to said dental floss dispensing hole for cutting the dental floss.

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**5,490,531**

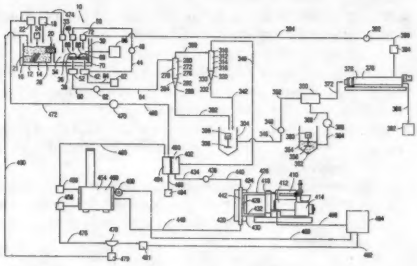
## APPARATUS FOR REMOVING HYDROCARBON CONTAMINANTS FROM SOLID MATERIALS

**Gregory A. Bala, and Charles P. Thomas, both of Idaho Falls, Id., assignors to Lockheed Idaho Technologies Company, Idaho Falls, Id.**

**Division of Ser. No. 198,076, Feb. 17, 1994, Pat. No. 5,454,878. This application May 16, 1995, Ser. No. 442,031**

**Int. Cl.**[6] **B08B** *3/12*

**U.S. Cl. 134—109** **7 Claims**



**1**. An apparatus for removing hydrocarbon contaminants from solid materials comprising:

a containment vessel sized to receive a mixture therein comprising a supply of solid material combined with at least one hydrocarbon contaminant composition and a solvent designed to remove said hydrocarbon contaminant composition from said solid material;

a washing chamber operatively connected to said containment vessel, said washing chamber comprising at least one screen member therein, said screen member being sized to receive said mixture thereon from said containment vessel, said washing chamber further comprising first water delivery means therein positioned above said screen member for delivering a supply of washing water onto said screen member and said mixture thereon in order to produce a purified solid product which remains on said screen member and a drainage product which passes through said screen member, said drainage product comprising said washing water, said solvent with said hydrocarbon contaminant composition dissolved therein, and finely-divided portions of said solid material small enough to pass through said screen member;

first separating means in fluid communication with said washing chamber for separating said drainage product into a first fraction and a second fraction, said first fraction comprising said solvent with said hydrocarbon contaminant composition dissolved therein, and said second fraction comprising said washing water and said finely-divided portions of said solid material which passed through said screen member;

second separating means in fluid communication with said first separating means for separating said first fraction into a third fraction and a fourth faction, said third fraction comprising said solvent with said hydrocarbon contaminant composition dissolved therein, and said fourth fraction comprising any residual water and residual solid material which remained in said first fraction after said separating of said drainage product into said first fraction and said second fraction;

third separating means in fluid communication with said first separating means and said second separating means for receiving a combination of said second fraction and said fourth fraction therefrom and separating said combination into a fifth fraction and a sixth fraction, said fifth fraction comprising said washing water from said second fraction and said residual water from said fourth fraction which combine to produce a supply of recycled water, with said sixth fraction comprising said finely-divided portions of said solid material from said second fraction and said residual solid material from said fourth fraction;

first conduit means connected to and between said third separating means and said washing chamber for transferring said fifth fraction from said third separating means to said washing chamber for use therein;

fourth separating means in fluid communication with said second separating means for separating said third fraction into a seventh fraction and an eighth fraction, said seventh fraction comprising a supply of recovered solvent, and said eighth fraction comprising said hydrocarbon contaminant composition; and

second conduit means connected to and between said fourth separating means and said containment vessel for transferring said seventh fraction from said fourth separating means to said containment vessel for use therein.

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**5,490,532**

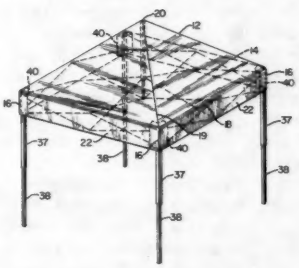
## ADJUSTABLE TENSION SHELTER ASSEMBLY

**Steven E. Mallookis, Littleton, and Albert W. Gebhard, Denver, both of Colo., assignors to Colorado Mineral Strike, Inc., Englewood, Colo.**

**Filed Jul. 8, 1994, Ser. No. 272,015**

**Int. Cl.**[6] **E04H** *15/26*

**U.S. Cl. 135—117** **15 Claims**



**1**. In a shelter of the type having an awning and a collapsible frame having vertical support legs at spaced peripheral intervals beneath said awning, and a center support extending upwardly from said frame into engagement with an undersurface portion of said awning at its center, the improvement comprising:

said center support including upper and lower telescoping sleeve members with an upper terminal end of said upper sleeve member engaging the undersurface of said awning, biasing means defined by a spring member mounted under compression between said upper and lower sleeve members resiliently urging said upper sleeve member in a direction causing said awning to be raised at its center, and adjustment means

engaging said biasing means for regulating the degree of tension exerted by said biasing means on said upper sleeve and awning, said adjustment means including a nut slidable axially with respect to said upper and lower sleeve members and a manually adjustable threaded rod extending upwardly from a lower end of said lower sleeve into threaded engagement with said nut.

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**5,490,533**

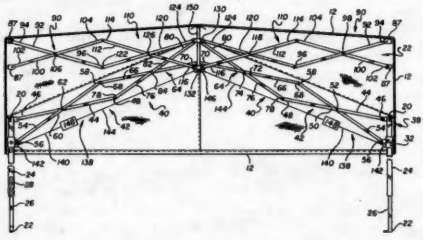
**COLLAPSIBLE SHELTER WITH ELEVATED CANOPY**

**Mark C. Carter, 10131 Kernwood Ct., Alta Loma, Calif. 91737**

**Filed Apr. 5, 1993, Ser. No. 42,996**

**Int. Cl.[6] E04H** *15/50*

**U.S. Cl. 135—145** **23 Claims**



1. A collapsible shelter, comprising:

a canopy having at least three sides and at least three corners;

at least three vertically disposed legs supporting said canopy, with one of said legs disposed under each of said canopy corners, each of said legs having an upper end and a lower end;

at least one perimeter truss means connected to each of said legs, each of said perimeter truss means including first and second link members, said first link member having an outer end connected to the upper end of one said leg, and said second link member having an outer end slidably connected to said leg, and said first and second link members being pivotally connected together in a scissors configuration, said first link member having a longitudinal center and a pivot point connected to said second link member, said pivot point of said first link member being spaced apart from said longitudinal center toward said outer end a predetermined distance, and said second link member having a longitudinal center and a pivot point connected to said first link member, said pivot point of said second link member being spaced apart from said second link member longitudinal center away from said outer end said predetermined distance, so that said perimeter truss means is extendable from a first collapsed position to a second extended position extending above said leg; and

at least two central truss means, each said central truss means including a pair of first and second link members connected together in a scissors configuration, each of said central truss pairs being connected to the inner ends of one said perimeter truss means, said first and second link members being pivotally connected together in a scissors configuration so as to be extendable from a first collapsed position to a second extended position.

**5,490,534**

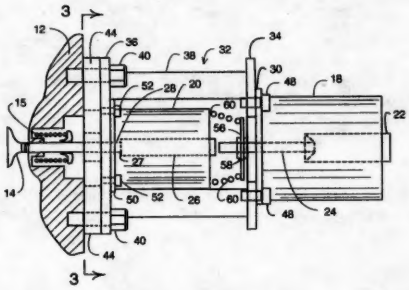
**DOUBLE SOLENOID VALVE ACTUATOR**

**Russell J. Van Rens, Milwaukee, Wis., assignor to Outboard Marine Corporation, Waukegan, Ill.**

**Continuation of Ser. No. 874,755, Apr. 27, 1992, abandoned. This application Dec. 17, 1993, Ser. No. 169,537**

**Int. Cl.[6] F16K** *31/00*

**U.S. Cl. 137—1** **34 Claims**



1. A method of controlling the movement of an object between first and second positions with first and second solenoid means respectively having first and second moveable core means that are operatively coupled to one another and with the object, with the first core means having a greater mass than the second, there being a second biasing means biasing the first core means away from the second core means, the object being biased by a first biasing means with a predetermined force toward said first position, said method quickly moving the object from said second to said first position, said method comprising the steps of:

energizing the first solenoid means to move the first core means into contact with and moving said second core means and also overcoming the predetermined biasing force of the first biasing means to thereby move the object to the second position;

energizing the second solenoid means to hold said second core means and the object in the second position;

de-energizing the first solenoid means so that the second biasing means moves the first core means out of contact with the second core means; and,

de-energizing the second solenoid means so that the first biasing means moves the object rapidly toward the first position and simultaneously moving the second core means towards the first core means.

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**5,490,535**

**VALVE FOR CONTROLLING A FLUID MEDIUM FLOWING UNDER PRESSURE**

**Alfred Fromm, Reutlingen, Germany, assignor to Bebro-Electronic Bengel & Bross GmbH, Frickenhausen, Germany**

**PCT No. PCT/EP93/00876, § 371 Date Oct. 24, 1994, § 102(e) Date Oct. 24, 1994, PCT Pub. No. WO93/22590, PCT Pub. Date Nov. 11, 1993**

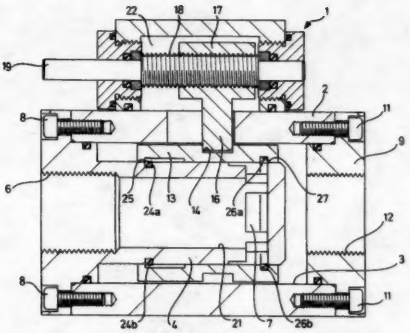
**PCT Filed Apr. 9, 1993, Ser. No. 325,312**

**Claims priority, application Germany, Apr. 27, 1992, 42 13 809.4**

**Int. Cl.[6] F16K** *31/44;3/24;1/12*

**U.S. Cl. 137—219** **13 Claims**

1. Valve (**1**) for controlling a fluid medium flowing under pressure, comprising inlet openings (**6**) and outlet openings, an inlet member (**4**) having the medium flowing axially therethrough, a sleeve-shaped control member (**13**) axially displaceable between a closed and an open position in relation to the inlet member (**4**), a first radially projecting, elastic sealing ring (**24***b*) and a first annular sealing edge (**25**) adapted to be pressed sealingly against the first sealing ring (**24***b*) in the closed position of the control member (**13**), whereby the displaceable control member (**13**) is enclosed by a valve housing (**2**) and the space between the control member (**13**)



and valve housing (**2**) is acted upon with the fluid medium flowing under pressure so that essentially no resulting pressure in axial direction is present at the control member (**13**) and therefore the control member is displaceable without any appreciable expenditure of force, a second radially projecting, elastic sealing ring (**26***b*) is provided in axial spaced relation to the first sealing ring (**24***b*) and a second annular sealing edge (**27**) is adapted to be pressed sealingly against the second sealing ring (**26***b*) in the closed position of the control member (**13**), characterized in that the first and second annular sealing edges (**25**, **27**) are designed to be relatively sharp and like knife edges and in a closed position of the valve form a sealing region in the form of a circular line between the first and second sealing rings (**24***b*, **26***b*), on the one hand, and the first and second sealing edges (**25**, **27**), on the other hand.

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**5,490,536**

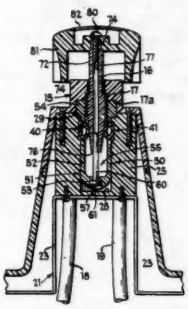
**PINCH TUBE PROPORTIONING VALVE AND CONTROL CAM CARTRIDGE THEREFOR**

**George S. Cole, Pebble Beach, Calif., and Harry W. Edwards, Barrington, Ill., assignors to George S. Cole & Associates, Incorporated, Thousand Oaks, Calif.**

**Filed Feb. 23, 1995, Ser. No. 393,430**

**Int. Cl.**[6] **F16K** *11/14;51/524;43/00*

**U.S. Cl. 137—315** **18 Claims**



**10**. In a pinch tube proportioning valve including a support structure defining an elongated valve cavity having a longitudinal axis and a pair of spaced resilient valve tubes disposed in the cavity and respectively providing communication between two fluid supply conduits and a fluid outlet, the improvement comprising: a control cam cartridge removably insertable as a unit in the valve cavity between the valve tubes, said cartridge including a housing having a cylindrical side wall with open and closed ends and an end wall closing said side wall at said closed end and cooperating therewith to define a cam chamber, said side wall having a pair of notches therein at opposite sides thereof respectively forming openings communicating with said chamber, said closed end of said housing being removably insertable in the valve cavity between the tubes to a use position with the tubes respectively seated in said notches and projecting into said chamber, and an elongated tapered cam member telescopically received axially in said chamber for engagement with the tubes, said cam member being rotatable about the axis and axially movable between retracted closing and extended opening positions and having a cylindrical valve-closing portion and an eccentric frustoconical valve-opening portion which control the proportioning and the rate of flow through the valves tubes.

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**5,490,537**

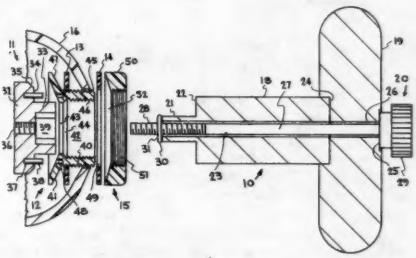
**PROSTHESIS AIR VALVE ASSEMBLY AND TOOL THEREFOR**

**David A. Hill, P.O. Box 3843, Turlock, Calif. 95381-3843**

**Filed Apr. 1, 1993, Ser. No. 42,084**

**Int. Cl.**[6] **F16K** *43/00;* **A61F** *2/60;2/76*

**U.S. Cl. 137—315** **18 Claims**



**1**. In combination, an improved valve housing assembly and a tool for installing the valve housing assembly in an opening of an associated member such as a prosthesis socket, including:

a valve housing assembly including a flanged housing having a first section adapted to be inserted into and extending through an opening in such an associated member,

a gasket means adapted to be positioned between a second section of said flanged housing and an area surrounding the opening in and located within the associated member,

a retainer means adapted to be removably connected to said first section of said flanged housing extending through the opening in an associated member,

a spanner member adapted to be removably connected to said flanged housing; and

a spanner tool having a section thereof adapted to be inserted into and extend through said flanged housing of said valve assembly and removably connected to said spanner member,

whereby said flanged housing is retained from turning in the opening of the associated member by a portion of said spanner member engaging the second section of said flanged housing and by a portion of said spanner tool engaging the first section of said flange housing while said retainer means is removably secured to said flanged housing, said spanner member and said spanner tool being operatively coupled to one another causing said gasket means to compress and form a seal between an interior set surface around the associated member opening and said second section of said flanged housing, whereafter said spanner tool is removed from said spanner member and from said flanged housing, and said spanner member is removed from said flanged housing.

**5,490,538**

## AUTOMATIC RAIN WATER COLLECTION DEVICE ON DOWNPIPE

**Robert Marcel, 3, rue de la Papeterie, and Michel Babaz, 11, rue du Levant, both of 74960 Cran-Gevrier, France**

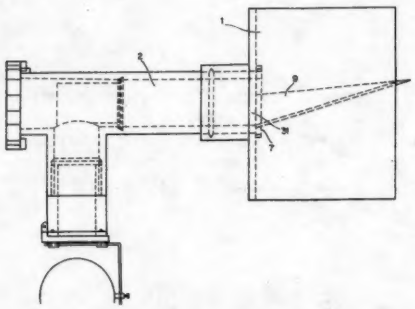
**PCT No. PCT/FR93/00102, § 371 Date Jun. 24, 1994, § 102(e) Date Jun. 24, 1994, PCT Pub. No. WO93/15281, PCT Pub. Date Aug. 5, 1993**

**PCT Filed Jan. 29, 1993, Ser. No. 256,162**

**Claims priority, application France, Jan. 31, 1992, 92 01319**

**Int. Cl.[6] E03B** *3/02;* **B04D** *13/08*

**U.S. Cl. 137—357** **10 Claims**



**1**. Device for collecting rain water from inside a drain pipe characterised in that it comprises:

a deformable scoop (**9**) adapted to be compressed for insertion into an orifice formed in the side of said pipe and adapted thereafter to resume its shape to collect water flowing in said drain pipe and to remove it from said pipe,

a saddle (**1**) adapted to be fitted to the drain pipe and having an orifice (**31**) coincident with the orifice formed in the drain pipe, the saddle (**1**) fastening the device to the drain pipe,

a body (**2**) extending said deformable scoop (**9**) and passing through the saddle (**1**) to remove water from said drain pipe.

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**5,490,539**

## PRESSURE REGULATOR FOR MAINTAINING A STABLE FLOW LEVEL OF A FLUID

**Nils T. Ottestad, Tønsberg, Norway, assignor to Ottestad Breathing Systems AS, Norway**

**PCT No. PCT/NO92/00185, § 371 Date Oct. 21, 1994, § 102(e) Date Oct. 21, 1994, PCT Pub. No. WO93/11383, PCT Pub. Date Jun. 10, 1993**

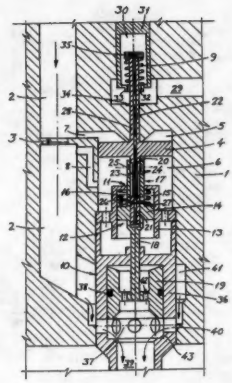
**PCT Filed Nov. 24, 1992, Ser. No. 244,451**

**Claims priority, application Norway, Nov. 25, 1991, 914592**

**Int. Cl.[6] G05D** *7/01*

**U.S. Cl. 137—486** **20 Claims**

**1**. A flow regulator for maintaining a stable rate of flow of a fluid in a flow channel (**2**), comprising a flow-actuated element (**4**) which is movable under the influence of a pressure drop in the fluid flow, and a throttle valve (**10**) for regulating the fluid flow under the influence of said element (**4**), characterized in that flow-actuated element (**4**) constitutes a control element for a servo means (**11**) comprising a pilot valve (**17**) for controlling the movement of a drive means (**12**) coupled to a valve body (**19**) in the throttle valve (**10**) and which, by means of the servo means (**11**), is arranged to be moved in a smooth manner independently of sudden changes in the fluid flow, said control element (**4**) being arranged to be moved in the flow direction only when the rate of flow exceeds a preselected level and being influenced by a prestressed spring (**9**) acting in the opposite direction to the flow direction, the prestressing force is adjustable for setting of the preselected flow level, said control element (**4**) including a piston forming a partition between a first chamber (**5**) connected to the flow channel (**2**) upstream of a pressure-drop orifice (**3**) in the channel, and a second



chamber (**6**) connected to the channel (**2**) at the downstream side of the orifice (**3**), and that the drive means (**12**) is arranged in the second chamber (**6**) and comprises a piston housing (**3**) and a drive piston (**14**) which together defines a third chamber (**15**) at the side of the piston (**14**) facing away from the throttle valve (**10**), the third chamber (**15**) by means of the pilot valve (**17**) being arranged to be filled with fluid from the second chamber (**6**) or emptied of fluid in dependence on the movement of the control element (**4**), the drive piston (**14**) at the side facing the throttle valve (**10**) being influenced by the pressure in the second chamber (**6**), and on the opposite side being influenced by the force from a prestressed drive spring (**16**) and by the pressure from the fluid supplied to the third chamber (**15**), so that the drive piston (**14**) is moved when the resulting force from the drive spring (**16**) and the fluid pressure in the third chamber (**15**) exceeds or becomes less than the force influence from the pressure in the second chamber (**6**).

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**5,490,540**

## UNIT FOR A SINGLE-LEVER MIXING VALVE

**Uwe Vom Dahl; Peter Lange, and Helmut Ziebach, all of Luedenscheid, Germany, assignors to Fluehs Drehtechnik GmbH, Luedenscheid, Germany**

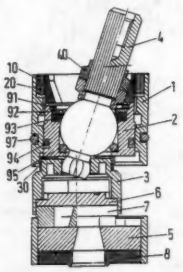
**PCT No. PCT/DE93/00864, § 371 Date Jul. 18, 1994, § 102(e) Date Jul. 18, 1994, PCT Pub. No. WO94/11660, PCT Pub. Date May 26, 1994**

**PCT Filed Sep. 15, 1993, Ser. No. 256,586**

**Claims priority, application Germany, Nov. 17, 1992, 42 38 671.3**

**Int. Cl.[6] F16K** *11/18*

**U.S. Cl. 137—625.17** **23 Claims**



**1**. A unit for a single-lever mixing valve, comprising:

a fixed housing defining an upper region, and a bottom, inlet region;

an inner sleeve located within said fixed housing;

a cage located within said fixed housing and adjacent to said inner sleeve, said cage being rotatable and radially displaceable relative to said housing;

a spindle swively mounted obliquely inside said inner sleeve, and engaging said cage, said spindle being actuated externally relative to said fixed housing; and

a plurality of flat, superposed washers each having at least one opening therethrough, one of said washers being an inlet valve attached to said fixed housing, another of said washers being a distributor, temperature valve attached to said cage, and another of said washers being a volume valve forming a shim fitted between said inlet valve and said temperature valve, said volume valve and said cage being together radially displaceable on said inlet valve relative to said fixed housing, said temperature valve and said volume valve being together radially displaceable relative to said inlet valve, and said temperature valve and said cage being rotatable together relative to said volume valve.

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**5,490,541**

**FIBROUS CASING**

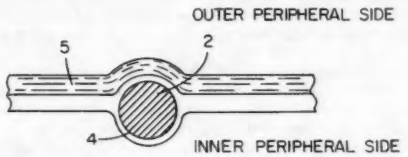
**Tomoaki Yamamoto, Naruto, and Manabu Andou, Tokushima, both of, Japan, assignors to Toho Serofan Company Limited, Tokushima, Japan**

**Filed Apr. 5, 1993, Ser. No. 42,684**

**Claims priority, application Japan, Apr. 22, 1992, 4-129608**

**Int. Cl.[6] F16L** *11/00;* **A22C** *13/00*

**U.S. Cl. 138—118.1** **5 Claims**




1. A fibrous casing which comprises;

a cylindrical fibrous web and a regenerated cellulose layer formed on at least an inner peripheral side or an outer peripheral side of the cylindrical fibrous web; and

means embedded in the regenerated cellulose layer for tearing the fibrous casing along a longitudinal direction, said means for tearing comprising a strand of yarn or fibrous filament which is embedded in the regenerated cellulose layer.

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**5,490,542**

**COMPOSITE METAL TUBE AND METHOD OF MAKING THE SAME**

**Ralph A. Iorio, Bloomfield Hills, and Glen A. Gibbs, Warren, both of Mich., assignors to ITT Corporation, New York, N.Y.**

**Division of Ser. No. 806,173, Dec. 12, 1991, Pat. No. 5,339,867. This application Jun. 16, 1994, Ser. No. 260,523**

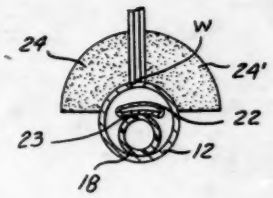
**The portion of the term of this patent subsequent to Aug. 23, 2094, has been disclaimed.**

**Int. Cl.[6] B23K** *11/00*

**U.S. Cl. 138—140** **22 Claims**

1. A method for manufacturing a metal tube having an interior surface resistant to interaction with materials to be conveyed therethrough, the method comprising:

positioning a length of non-reactive tubing having a predetermined outer diameter within an inner diameter of metal tubing of essentially corresponding length, said metal tube having an unsealed side seam, wherein said inner diameter of said metal tube is greater than said outer diameter of said polymeric tubing;




sealing said unsealed side seam of said metal tube while maintaining said non-reactive tubing at a location within said metal tubing opposed to said side seam during said sealing step; and

reducing said sealed metal tubing to an outer diameter essentially equal to said predetermined outer diameter of said non-reactive interior tubing.

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**5,490,543**

**TWO-PLY WARP TWO-PLY WEFT PAPERMAKING FABRIC HAVING AUXILIARY WEFT YARNS INCORPORATED IN PAPERMAKING SIDE FABRIC**

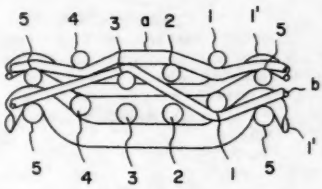
**Shigenobu Fujisawa, Tokyo, Japan, assignor to Nippon Filcon Co., Ltd., Tokyo, Japan**

**Filed Mar. 14, 1995, Ser. No. 404,820**

**Claims priority, application Japan, Mar. 18, 1994, 6-085196**

**Int. Cl.[6] D03D** *23/00*

**U.S. Cl. 139—383 A** **11 Claims**




1. A two-ply warp two-ply weft papermaker fabric having auxiliary weft yarns incorporated in a papermaking side fabric thereof, which papermaker fabric comprises (a) an at least 3-shaft papermaking side fabric consisting of papermaking side warps and papermaking side weft yarns, forming long crimps of warps on the papermaking side thereof, and having auxiliary weft yarns of a smaller diameter than said warps incorporated in said papermaking side weft yarns, (b) a weft wear type running side fabric consisting of running side warps and running side weft yarns and having the running surface thereof formed of long crimps of said weft yarns, and (c) binding yarns intersecting said papermaking side warps on the upper side thereof and intersecting said running side warps on the lower side thereof thereby connecting said papermaking side fabric and said running side fabric.

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**5,490,544**

**METHOD AND APPARATUS FOR INHIBITING AIR INFILTRATION INTO FUEL DISPENSING LINES**

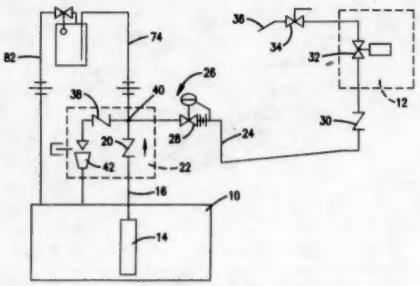
**Russell L. Broline, Milan, Ill., assignor to The Marley Pump Company, Mission, Kans.**

**Filed Jul. 26, 1994, Ser. No. 280,724**

**Int. Cl.[6] B65B** *1/04;3/04*

**U.S. Cl. 141—1** **19 Claims**

1. In an apparatus having a fuel storage tank, a fuel dispenser, a product line which extends from the storage tank to the fuel dispenser and which is normally maintained at a normal operating




pressure and a pump for pumping fuel from the tank to the dispenser, the improvement comprising:

a reservoir adapted to contain fuel, said reservoir having a liquid port connected with said product line and a vent connected with a low pressure below the normal operating pressure; and

valve means for opening and closing said vent in response to the pressure applied to the reservoir through said liquid port, said valve means being arranged to maintain said vent closed at the normal operating pressure and to open said vent when the pressure in the reservoir drops to a predetermined level below the normal operating pressure, said valve means being arranged to close the vent again when the pressure in the reservoir rises to the normal operating pressure again.

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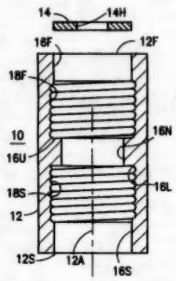
**5,490,545**

## VORTEX CONNECTOR

**Michael D. Sokoloff, 2616 Madison Rd., Cincinnati, Ohio 45208, and Randy A. Johnson, Cincinnati, Ohio, assignors to Michael D. Sokoloff, Cincinnati, Ohio**

**Filed Aug. 31, 1994, Ser. No. 298,293**
**Int. Cl.[6] B65B** *3/04*
**U.S. Cl. 141—319** **23 Claims**



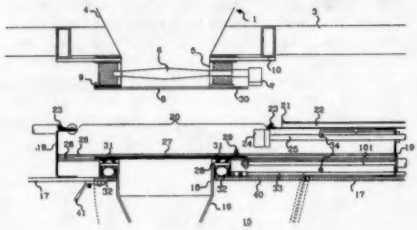

**1**. A vortex connector for at least one bottle having a male helically-threaded neck comprising a hollow tubular-threaded connector body having female helical threads disposed internally within at least a first open end thereof, a second open end opposite said first open end, a wide opening passage between said first and second open ends, an insert-abutting projection adjacent said wide opening passage, and a removable first insert abutting said insert-abutting projection, said first insert being freely movable and having at least a first insert opening therethrough, said first insert opening having a smaller cross-sectional area than a cross-sectional area of said wide opening passage such that any vortex effects on usage of said vortex connector with said first insert is dependent on said first insert, and wherein said connector body has a fixed length and said first insert creates vortex effects on usage of said vortex connector.

**5,490,546**

## INSTALLATION AND METHOD FOR TRANSFERRING PRODUCTS FLOWING OUT UNDER GRAVITY

**Willy Lhoest, Brussels, Belgium, assignor to Elveco msj S.A., Brussels, Belgium**

**Filed Mar. 24, 1994, Ser. No. 217,251**
**Claims priority, application France, Apr. 1, 1993, 93 03832**
**Int. Cl.[6] B65B** *1/04;3/00;* **B67C** *3/00*
**U.S. Cl. 141—346** **20 Claims**



**1**. A device for transferring, without contamination, products flowing out under gravity from an upper receptacle including a lower orifice, the mouth of which points downwards, towards a lower pipe situated at a lower level than the upper receptacle and including an upper orifice, the mouth of which points upwards, wherein each orifice of said upper receptacle and lower pipe is closed off by a moveable cover, the said device being comprised of:

a hermetic enclosure defining an inside volume and surrounding the orifice of said lower pipe, and including an access opening shaped such that the mouth of the orifice of the upper receptacle is insertable therein;

first closing-off means for closing said access opening and isolating the inside volume of the enclosure with respect to the ambient atmosphere when said upper receptacle is not inserted therein, and actuating means for opening said first closing-off means such that said upper receptacle is capable of being inserted therein;

second closing-off means for isolating the inside volume of the enclosure with respect to the ambient atmosphere when the mouth of said upper receptacle is inserted therein;

means capable of opening the respective covers of the upper receptacle and lower pipe when their orifices are facing each other and when the enclosure is isolated from the ambient atmosphere by the second closing-off means;

means for injecting a flow of gas into the inside volume of the enclosure surrounding the respective mouths of the upper receptacle and lower pipe; and,

means connected to the inside volume of the enclosure for sucking up the flow of gas.

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**5,490,547**

## SYSTEM FOR PROVIDING A SUPPLY OF CHILLED FLUID

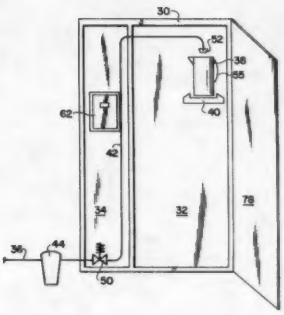
**Meyer Abadi, Abanico a Maturin, Edificio Optipro #19, Parraquia, Altagracia, Caracas, and Ernesto Hueso, Av. Sucre de los Dos Caminos, Edificio Yutaje, Apto. A-214, Caracas, both of, Venezuela**

**Filed Aug. 12, 1994, Ser. No. 289,438**
**Int. Cl.[6] B65B** *3/00*
**U.S. Cl. 141—359** **13 Claims**

**1**. A system for providing a supply of chilled fluid, said system comprising:

a refrigerator cabinet having a refrigerated food storage area capable of storing a plurality of different solid food items and a door for accessing said refrigerated food storage area;

a serving vessel removably located within said refrigerated food storage area for containing fluid therein such that said fluid within said serving vessel is chilled when said serving vessel




is located within said refrigerated food storage area, said serving vessel also permitting said fluid to be conveniently transported outside said refrigerated food storage area in said serving vessel for selectively dispensing said fluid from said serving vessel;

a first sensing means for sensing whether said door is open;

a second sensing means for sensing whether said serving vessel is at a predetermined location within said refrigerated food storage area;

a third sensing means for sensing an amount of fluid contained in said serving vessel,

a fluid supply system providing said fluid to said serving vessel via a dispenser located in said food storage area in response to outputs from said first sensing means, said second sensing means, and said third sensing means.

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**5,490,548**

**METHOD AND APPARATUS FOR CONTROLLING VENEER LATHE KNIFE CLEARANCE ANGLE**

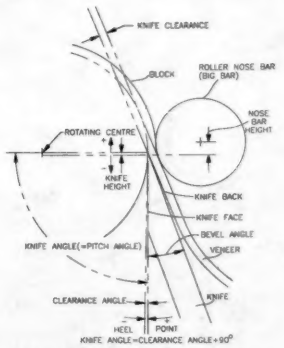
**Jussi E. T. Puranen, Coquitlam, Canada, assignor to Durand-Raute Industries Ltd., New Westminster, Canada**

**Filed Jan. 18, 1995, Ser. No. 374,185**

**Claims priority, application Finland, Jan. 18, 1994, 940239**

**Int. Cl.**[6] **B27B** *1/00;* **B27L** *5/00;* **G08B** *21/00*

**U.S. Cl. 144—356** **6 Claims**




**1**. A method of controlling the clearance angle of a veneer lathe knife in a veneer lathe having a knife holder beam rotatably mounted on a knife carrier, said method comprising the steps of:

(a) measuring vibration frequency of said beam;

(b) comparing said measured vibration frequency with a stored representation of a vibration frequency range characteristic of disruption of veneer peeling;

(c) if said comparison reveals that said measured vibration frequency is within said range characteristic of disruption of veneer peeling, rotatably adjusting said beam until said comparison reveals that said measured vibration frequency is not within said range characteristic of disruption of veneer peeling; and,

(d) repeating steps (a) through (c) continuously throughout peeling of a block.

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**5,490,549**

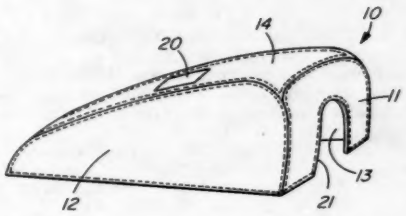
**FENDER AND FUEL TANK COVERS FOR A MOTORCYCLE**

**Douglas A. Biette, Moose Jaw, Canada, assignor to 607541 Saskatchewan Inc., Moose Jaw, Canada**

**Filed Jun. 29, 1994, Ser. No. 265,060**

**Int. Cl.**[6] **B65D** *65/04*

**U.S. Cl. 150—167** **4 Claims**




**1**. A cover for a gas tank of a motorcycle comprising:

two opposed side panels, each having a bottom edge having a first and second end, a front edge extending upward from the bottom edge first end which joins a substantially arcuate top edge extending from the bottom edge second end to the front edge,

a first panel portion extending between the top edges of the side panels substantially along their entire length, the first panel portion being contiguous along its entire extent,

a second panel portion extending between the front edges of the side panels along substantially their entire length,

the cover having an open bottom to allow the cover to be placed on a motorcycle gas tank.

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**5,490,550**

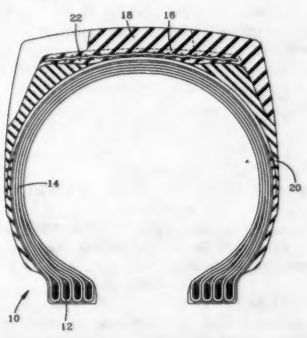
**CUT RESISTANT TIRE**

**Johnny D. Massie, II, Lexington, Ky.; Paul W. Hobart, Wadsworth, and Jerry Malin, Akron, both of Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio**

**Continuation of Ser. No. 964,229, Oct. 21, 1992, abandoned. This application May 27, 1994, Ser. No. 250,235**

**Int. Cl.**[6] **B60C** *9/00;9/18;19/12*

**U.S. Cl. 152—193** **3 Claims**



1. A heavy duty pneumatic tire comprising at least a pair of parallel annular beads, carcass plies wrapped around said beads, reinforcement plies disposed radially over said carcass plies in a crown area of the tire, a tread disposed radially over said reinforcement plies, and sidewalls disposed between said tread and said beads, the improvement wherein continuous monofilament brass coated steel wire having a diameter of 0.4 to 1.2 mm is included in or radially under said tread as the warp and weft wires in a woven structure, wherein when said tire is in an unvulcanized and unexpanded state said warp and weft wires in said woven structure are inclined at an angle of substantially 45 degrees with respect to the equatorial plane of the tire, said warp and weft wires being free to move relative to one another, and wherein before incorporation in a wire structure said brass coated steel wire has an elongation at break of 2 to 8% and a tensile strength of 1300 MPa to 3500 MPa.

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**5,490,551**

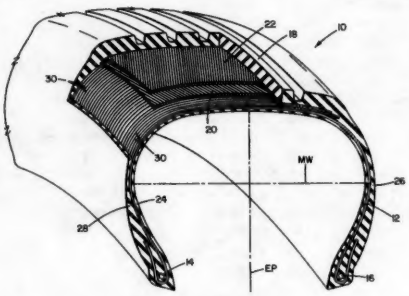
## RADIAL TIRES CONTAINING STEEL MONOFILAMENT IN THE CARCASS PLY

**Amit Prakash, Hudson; Dong K. Kim, Akron; Robert M. Shemenski, North Canton, and William C. Lewis, Cuyahoga Falls, all of Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio**

**Continuation of Ser. No. 232,305, Apr. 25, 1994, abandoned, which is a continuation of Ser. No. 946,698, Sep. 18, 1992, abandoned. This application Apr. 19, 1995, Ser. No. 425,686**

**Int. Cl.**[6] **B60C** *9/02;9/04;9/08*

**U.S. Cl. 152—556** **16 Claims**




1. A pneumatic radial tire comprising:

(a) a pair of axially-spaced-apart annular beads; and

(b) at least one carcass ply which extends between said beads and is folded thereabout wherein at least one of said at least one carcass ply comprises a layer of steel monofilaments arranged so as to have from 25 to 124 ends per inch when measured in a tire circumferential direction at a location having a tire maximum width, each said steel monofilament having

a tensile strength of at least 3650 MPa,

a diameter of from 0.1 mm to less than 0.20 mm,

a total elongation of at least 2%, and

a torsion value of at least 20 turns with a gauge length of 200 times the diameter of said monofilament.

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**5,490,552**

## PNEUMATICALLY OPERATED TYRE REMOVAL MACHINE

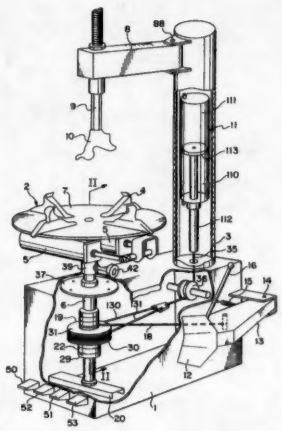
**Giuliano Vignoli, 144, Via Scaglia Est, I - 41100 Modena, Italy**

**Filed Aug. 25, 1994, Ser. No. 295,438**

**Claims priority, application Italy, Sep. 9, 1993, RE93A0065**

**Int. Cl.**[6] **B60C** *25/06*

**U.S. Cl. 157—1.24** **18 Claims**




1. A tyre removal machine comprising a frame (**1**) which contains a rotatable vertical shaft (**6**) carrying a self-centering unit (**2**), and is provided with a rear column (**3**) for supporting a tyre mounting/removal tool (**10**), and a rotatable arm (**13**) for supporting a bead release tool (**12**), comprising at least one flexible element (**35**) which at one end is connected to the rod (**112**) of a double-acting pneumatic cylinder-piston unit (**11**), its other end forking into two branches (**130**, **131**) which wind in opposing directions about two coaxial pulleys (**30**, **31**) which are idly mounted on said shaft (**6**) and are associated with respective coupling devices for making said coaxial pulleys selectively rigid with said shaft (**6**), and means (**34**) to cause said coaxial pulleys to rotate in order to rewind said branches (**130**, **131**).

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**5,490,553**

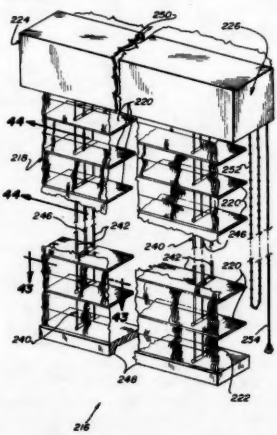
## FABRIC WINDOW COVERING WITH RIGIDIFIED VANES

**Wendell B. Colson, Boulder, Colo.; Richard N. Anderson, Whitesville, Ky.; Paul G. Swiszcz, Boulder, and Jason T. Throne, Broomfield, both of Colo., assignors to Hunter Douglas, Inc., Upper Saddle River, N.J.**

**Filed Nov. 9, 1993, Ser. No. 149,315**

**Int. Cl.**[6] **E06B** *9/06*

**U.S. Cl. 160—84.06** **23 Claims**




1. A window covering comprising in combination, a flexible sheet of fabric material having a front face and a rear face, a

plurality of parallel elongated fabric vanes having a longitudinal axis and forming variably directed flexible extensions from said rear face of said sheet, said fabric vanes having a stiffening compound impregnated into the fabric whereby said vanes retain a predetermined form, and control means for operably supporting said vanes and said sheet such that said sheet is suspended substantially vertically and for pivoting said vanes about said longitudinal axes so as to shift said window covering between an open condition wherein said vanes extend substantially perpendicularly to said sheet and a closed position wherein said vanes extend substantially parallel to said sheet.

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**5,490,554**

## TEEMING ARRANGEMENT FOR ALUMINUM CONTINUOUS CASTING APPARATUS

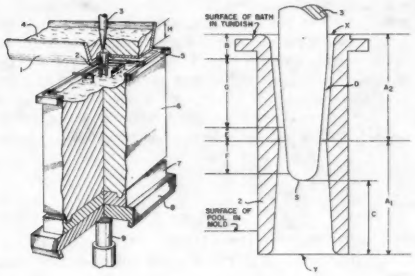
**C. J. Moritz, Bonn, Germany, assignor to Vaw Aluminium AG, Bonn, Germany**

**Filed Jul. 5, 1994, Ser. No. 271,890**

**Claims priority, application Germany, Jul. 5, 1993, 43 22 316.8**

**Int. Cl.**[6] **B22D** *41/50;11/10;11/18;* **B67D** *5/37*

**U.S. Cl. 164—437** **14 Claims**




1. A teeming arrangement for a continuous casting apparatus, particularly an apparatus for aluminum-containing materials, comprising a temporary holding vessel for a molten substance; a tubular member for discharging the molten substance from said vessel, said tubular member having an inlet end with a first end face, an outlet end with a second end face, and a location between said end faces at which the cross section of said tubular member is a minimum; and a valve member movable between a first position in which said tubular member is open and a second position in which said tubular member is closed, said tubular member and said valve member defining a gap in said first position, and said gap having an upstream section which extends from said first end face for a predetermined distance along said tubular member and narrows in downstream direction, the distance between said location and each of said end faces being at least 7 cm, said valve member having an end surface which is designed to face said outlet end, and said end surface being spaced from said second end face by at least 2 cm in said first position.

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**5,490,555**

## METHOD OF CONTROLLING FORCES APPLIED TO A CONTINUOUSLY CAST PRODUCT

**Thomas J. Korpela, Forest Hill, Md., assignor to Vöest-Alpine Services and Technologies Corp., Pittsburgh, Pa.**

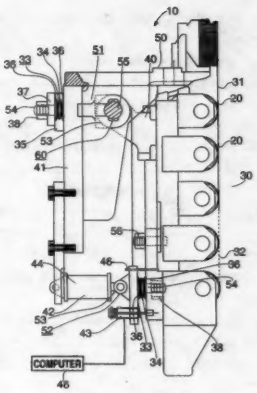
**Filed May 25, 1994, Ser. No. 249,160**

**Int. Cl.**[6] **B22D** *11/20;11/12;11/128;* **B22C** *19/04*

**U.S. Cl. 164—454** **11 Claims**

1. In a continuous casting system, an apparatus for dynamically controlling the forces exerted by the foot rollers on the continuous casting slab, the apparatus comprising:

a hinged foot roller assembly;




a cylinder for moving the assembly toward and away and away from the slab; and

an electronic sensor for signaling the cylinder to move the assembly relative to the slab such that contact between the foot rollers and the slab edge is maintained at a selected contact force regardless of slab width and without deformation of the slab or damage to the casting system, wherein the cylinder is oriented perpendicularly relative to the narrow face plates of the casting system.

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**5,490,556**

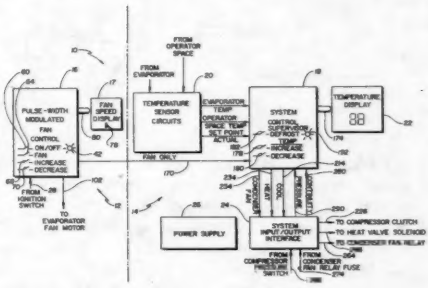
## OFF-ROAD AIR CONDITIONING CONTROL

**Andrew J. Pichotta, Minneapolis, Minn., assignor to Eagle Engineering and Manufacturing, Inc., Welcome, Minn.**

**Filed Jun. 9, 1993, Ser. No. 73,887**

**Int. Cl.**[6] **F25B** *29/00*

**U.S. Cl. 165—26** **25 Claims**




1. Apparatus for heating and cooling an enclosed operator space in an off-road vehicle comprising:

a) fan speed control means for controlling the speed of an evaporator fan to circulate air past an evaporator coil and into the enclosed operator space in an off-road vehicle;

b) compressor clutch control means for controlling energization of an electromagnetic clutch connected between a prime mover and an air conditioning compressor;

c) condenser fan control means for selectively energizing a fan to blow air across a condenser coil;

d) a first sensor circuit connected to sense the presence or absence of electrical continuity to the condenser fan and providing a two-state electrical signal representative thereof;

e) a second sensor circuit connected to a pressure switch coupled to sense refrigerant pressure at an output of the compressor and providing a two-state signal representative of whether the

refrigerant pressure at the compressor output is within a predetermined pressure range;

f) an operator space temperature sensor located in a flow path of the air circulating in the enclosed operator space and providing a signal representative thereof;

g) microprocessor system control means connected to the first and second sensor circuits and having an operator adjustable temperature input means for selecting a desired temperature for enabling operation when electrical continuity is present and the refrigerant pressure is within the predetermined pressure range wherein the system control means actuates the compressor clutch control means when the signal from the operator space temperature sensor indicates a temperature above the desired temperature;

h) a heating control loop for providing heat to increase the temperature in an operator space in the off-road vehicle; and

i) HEAT mode control means for controlling energization of the heating loop

wherein the microprocessor system control means is operative to energize the heating control loop when the signal from the operator space temperature sensor indicates a temperature below the desired temperature.

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**5,490,557**

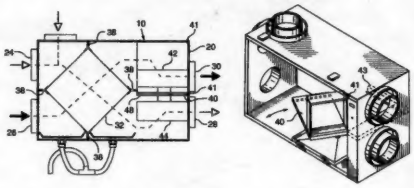
**HOUSING FOR A HEAT RECOVERY VENTILATOR WITH FANS HINGEDLY MOUNTED TO HOUSING**

**Wayne H. Taylor, Peterborough, Canada, assignor to Trent Metals Limited, Peterborough, Canada**

**Filed Oct. 7, 1994, Ser. No. 319,699**

**Int. Cl.[6] F24H** *3/02*

**U.S. Cl. 165—54** **4 Claims**



**1**. In a heat recovery ventilator comprising

a housing having an inlet and an outlet for a first fluid flow and an inlet and an outlet for a second fluid flow,

a heat exchange panel assembly having two sets of panels alternately arranged to form a first and a second flow path for each of the first fluid flow and the second fluid, said first flow path in fluid communication with said first fluid flow inlet and outlet and said second flow path in fluid communication with said second fluid flow inlet and outlet, said heat exchange panel slidably mounted within said housing,

a first fan and a second fan mounted on a fan mounting plate, wherein the improvement comprises said fan mounting plate is hingedly mounted to said housing and is pivotable between a servicing position and an operational position, said first and second fans are removable from the housing for servicing upon rotating said fan mounting plate to said servicing position and are positioned within said housing for effecting said first fluid flow and said second fluid flow when said fan mounting plate is in said operational position, said heat exchange panel slidingly engages said fan mounting plate and said fan mounting plate supports said heat exchange panel when in said operational position.

**5,490,558**

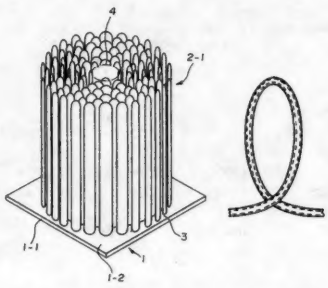
**L-TYPE HEAT SINK**

**Hisateru Akachi, Sagamihara, Japan, assignor to Actronics Kabushiki Kaisha, Isehara, Japan**

**Filed Jun. 4, 1993, Ser. No. 71,256**

**Int. Cl.[6] F28D** *15/02*

**U.S. Cl. 165—104.33** **13 Claims**



**1**. A heat sink, comprising:

a heat receiving plate having a heat radiating side; and

a belt-shaped member joined to said heat radiating side of said heat receiving plate, said belt-shaped member having a plurality of script's l-shaped pinlike portions arranged at predetermined levels, said belt-shaped member including a heat pipe with a small bore.

**12**. A heat sink as claimed in claim **1**, wherein said belt-shaped member is wound in a spiral to form a triangular pole.

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**5,490,559**

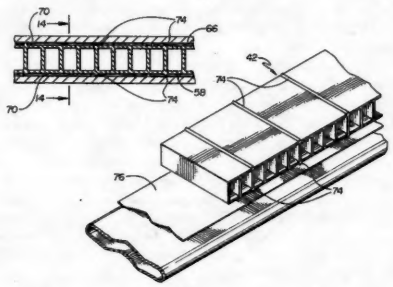
**HEAT EXCHANGER WITH FINNED PARTITION WALLS**

**Horia A. Dinulescu, 11217 Fetterly Rd., Minnetonka, Minn. 55305**

**Filed Jul. 20, 1994, Ser. No. 278,041**

**Int. Cl.[6] F28D** *1/053;* **F28F** *1/22*

**U.S. Cl. 165—148** **6 Claims**



**1**. A heat exchanger comprising:

a plurality of parallel tubes, each having an oblong cross section with flat side walls separating a first fluid from a second fluid, the first fluid flowing through the interior of the tubes and parallel with a longitudinal tube axis, and the second fluid flowing over the exterior of the tubes;

means for directing the fluids in and out of the heat exchanger;

at least one extended surface packet for heat transfer enhancement, each packet comprising at least three fins, a base plate, and a top plate being made materially continuous and formed integrally in one piece with no internal junctions from a heat conductive material;

the fins of each said extended surface packet being substantially parallel with each other and aligned with a direction of flow of the second fluid;

the base plate having an under face and an upper face opposed to each other, the under face being essentially planar, and the upper face having said fins extending away from and in substantially perpendicular relation to the base plate;

the top plate having an upper surface and an under surface opposed to each other, the upper surface being essentially planar, and the under surface having said fins extending away from and in substantially perpendicular relation to the top plate;

the under face of said base plate contacting one of the flat side walls of one of said tubes, the upper surface of said top plate contacting one of the flat side walls of an adjacent one of said tubes;

bonding means for attaching each said extended surface packet to the flat side walls of said tubes; said bonding means being applied essentially over an entire surface of the base plate under face and the top plate upper surface;

wherein one of said base plate under face and said top plate upper surface includes a plurality of integral spacer ridges.

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**5,490,560**

## HEAT EXCHANGER, PARTICULARLY FOR MOTOR VEHICLES

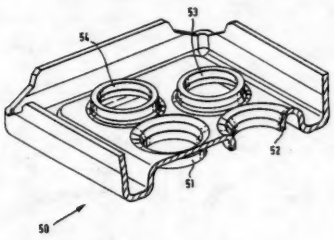
**Werner Helms, Esslingen/Zell; Karl-Heinz Rothfuss, Asperg, and Walter Wolf, Oppenweiler, all of, Germany, assignors to Behr GmbH & Co., Stuttgart, Germany**

**Filed Feb. 23, 1994, Ser. No. 200,382**

**Claims priority, application Germany, Feb. 26, 1993, 43 05 945.7**

**Int. Cl.[6] F28F** *9/02*

**U.S. Cl. 165—173** **19 Claims**




**1**. A heat exchanger, particularly for motor vehicles, comprising:

a collecting tank; and

a single metallic tube plate which has a primary side, a secondary side, a wall thickness and collars having a wall thickness approximately equal the wall thickness of the metallic tube plate, the collars being formed continuously from the metallic tube plate, and in which tubes are to be held and sealed,

wherein neighboring collars are alternately directed towards the primary side and towards the secondary side.

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**5,490,561**

## PURGE WATER MANAGEMENT SYSTEM

**Joao E. Cardoso-Neto, North Augusta, and Daniel W. Williams, Aiken, both of S.C., assignors to The United States as represented by the Department of Energy, Washington, D.C.**

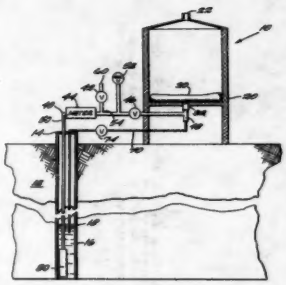
**Filed Mar. 6, 1995, Ser. No. 398,537**

**Int. Cl.[6] E21B** *49/08*

**U.S. Cl. 166—264** **20 Claims**

**17**. A method of obtaining a fluid sample from a groundwater monitoring well, said method comprising the steps of:

transporting a predetermined quantity of said groundwater from said well into a container having an interior and that expands to receive said groundwater into said interior so that said groundwater does not come into contact with air;



obtaining a sample of said groundwater from said well; and

returning said predetermined quantity of groundwater from within said expandable container to said well.

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**5,490,562**

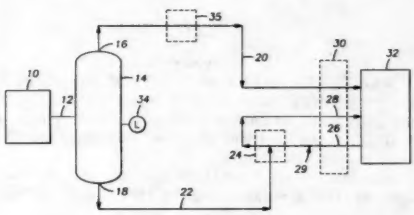
## SUBSEA FLOW ENHANCER

**Kenneth E. Arnold, Houston, Tex., assignor to Paragon Engineering Services Incorporated, Houston, Tex.**

**Filed Feb. 7, 1995, Ser. No. 384,924**

**Int. Cl.[6] E21B** *43/24*

**U.S. Cl. 166—267** **13 Claims**




**10**. A method of recovering hydrocarbons from a well, comprising the steps of:

receiving a composite hydrocarbon stream from a well into a separator and

separating the received composite stream into a vapor stream and liquid stream,

flowing the vapor stream from the separator through a vapor flowline;

circulating a recycle liquid through a circulating loop comprising a recycle

flowline and a liquid flowline;

flowing said liquid stream from said separator to an introducing means for introducing said liquid stream into said circulating loop.

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**5,490,563**

## PERFORATING GUN ACTUATOR

**David Wesson, Ike; Kevin R. George, Cleburne, and Flint R. George, Flower Mound, all of Tex., assignors to Halliburton Company, Houston, Tex.**

**Filed Nov. 22, 1994, Ser. No. 343,747**

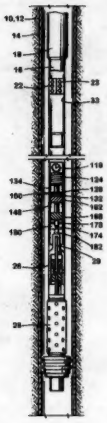
**Int. Cl.[6] E21B** *29/00;43/11*

**U.S. Cl. 166—297** **18 Claims**

**13**. A method of firing a perforating apparatus suspended within a well, comprising the steps:

a. presetting a timer in an actuator;

b. opening at least one port in the actuator upon expiration of the timer;



c. communicating well fluids through the port to a piston member in the actuator;
d. moving the piston member;
e. actuating an initiator upon the movement of the piston; and
f. detonating the perforating apparatus upon actuating the initiator.

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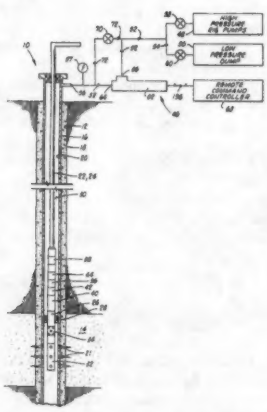
**5,490,564**

## PRESSURE CHANGE SIGNALS FOR REMOTE CONTROL OF DOWNHOLE TOOLS

**Roger L. Schultz, Richardson; Donald G. Kyle, Plano, and Neal G. Skinner, Lewisville, all of Tex., assignors to Halliburton Company, Houston, Tex.**

**Continuation of Ser. No. 993,260, Dec. 18, 1992, Pat. No. 5,355,960. This application Aug. 19, 1994, Ser. No. 293,688**
**Int. Cl.[6] E21B** *34/10*
**U.S. Cl. 166—374** **25 Claims**



1. A method of controlling a downhole valve in a well, said valve having open and closed positions, comprising:
(a) transmitting into said well a command signal including at least one high level pressure change applied to a column of fluid in said well;
(b) receiving said command signal and generating an electrical signal representative of said at least one high level pressure change;
(c) comparing said electrical signal to information stored in a control system for said downhole tool, said information identifying said at least one high level pressure change;
(d) by said comparing of step (c), verifying that said command signal is directed to said downhole tool;
(e) upon said verifying of step (d), moving said valve from one of its said open and closed positions to the other of its said open and closed positions; and
wherein in step (a), said at least one high level pressure change includes changing a pressure applied to said column of fluid in said well from a first value to a second value, both of said first and second values being sufficiently higher than hydrostatic pressure of said column of fluid in said well so that at the lower of said first and second values a majority of a possible compression of said column of fluid has already occurred said second value being at least about 1000 psi above hydrostatic pressure.

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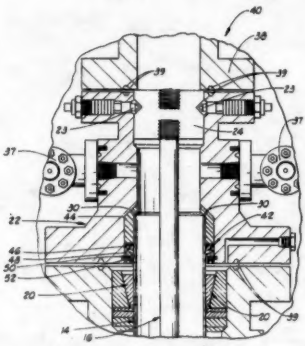
**5,490,565**

## CASING SEAL AND SPOOL FOR USE IN FRACTURING WELLS

**Dwight Baker, Rush Springs, Okla., assignor to Total Tool, Inc., Rush Springs, Okla.**

**Division of Ser. No. 163,239, Dec. 6, 1993, Pat. No. 5,456,320. This application May 31, 1995, Ser. No. 455,740**
**Int. Cl.[6] E21B** *19/00*
**U.S. Cl. 166—379** **16 Claims**



1. A seal assembly adapted to be disposed in a casing spool to effect a fluid tight seal about an upper end of a casing, the casing spool having an upper end portion, a lower end portion, a spool bore extending between the upper end portion and the lower end portion thereof with a counterbore portion formed in the lower end thereof, and an internal annular groove extending from the spool bore into the casing spool, the seal assembly comprising:
a sleeve adapted to be received in the counterbore portion of the spool bore of the casing spool, the sleeve having an upper end, a lower end and a sleeve bore extending between the lower end and the upper end thereof, the sleeve bore dimensioned to receive the upper end of the casing;
a seal member disposed adjacent the lower end of the sleeve so as to be sealingly disposable between the casing spool and the upper end of the casing;
a seal retainer ring disposed adjacent the seal member, the seal retainer ring having a lower surface and an upper surface;
a plurality of split ring members, each of the split ring members having an upper surface, a lower surface and an outwardly extending lip dimensioned to fit into the internal annular groove of the casing spool, the plurality of split ring members disposed adjacent the lower surface of the seal retainer ring such that the outwardly extending lip of each of the split ring members is disposed in the internal annular groove of the casing spool, the split ring members cooperating to form a

split ring having an inner diameter dimensioned to receive the upper end of the casing; and

securing means for securing the split ring members together thereby securing the sleeve, the seal member and the seal retainer ring in the casing spool.

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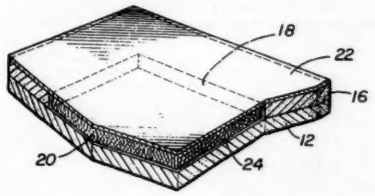
**5,490,566**

## FIRE EXTINGUISHING PANELS

**Robert W. Purser, Conyers, Ga., assignor to FireMelt International, Inc., Conyers, Ga.**

**Filed Aug. 9, 1993, Ser. No. 104,432**
**Int. Cl.[6] A62C** *35/10*
**U.S. Cl. 169—26** **12 Claims**




**1**. A fire extinguishing panel comprising:

(a) a bottom lamination formed of heat fusible polymeric material and having a bottom surface;

(b) a top lamination adapted to constitute an uppermost interface between any fire below the panel and structure above the top lamination, the top lamination having a top surface;

(c) at least one void in the panel between the top surface of the top lamination and the bottom surface of the bottom lamination;

(d) a collection layer connected to at least one of the laminations for collecting fused portions of the laminations when the panel is exposed to a predetermined heat level; and

(e) a fire extinguishing material disposed in the at least one void.

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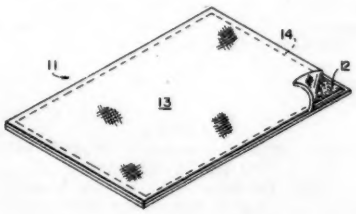
**5,490,567**

## FIRE EXTINGUISHING BLANKET

**Richard A. Speer, Shaker Heights, Ohio, assignor to Ohio Fire Absorbent, Inc., Shaker Heights, Ohio**

**Filed Jun. 23, 1994, Ser. No. 264,561**
**Int. Cl.[6] A62C** *8/06*
**U.S. Cl. 169—50** **8 Claims**




**1**. A fire extinguishing blanket for smothering a grease fire and absorbing the burning grease which is the cause of the fire, comprising:

an inner layer including a textile sorbent material which will absorb grease and oil, said material having a melting point greater than about 320° C. so that it does not melt at the temperature of the grease fire, and

a fire resistant, porous outer layer disposed about the inner layer, said outer layer being of a material which will not ignite or melt at the temperature of a grease fire and being sufficiently porous to permit grease to penetrate through to said inner layer where it is absorbed,

wherein when said blanket is positioned over a burning grease fire to cover the fire, said grease penetrates through said outer layer and is absorbed by said inner layer thereby depriving the fire of its fuel, and said outer layer forms an oxygen-excluding barrier which smothers the burning fire.

**8**. A method of extinguishing a grease fire and preventing re-ignition by covering the burning fire with a fire extinguishing blanket formed of an inner layer of a textile sorbent material surrounded by a porous fire resistant sheet material, passing the grease through the outer porous sheet material and absorbing said grease by the inner sorbent layer to remove the grease as the fire resistant sheet material smothers the fire.

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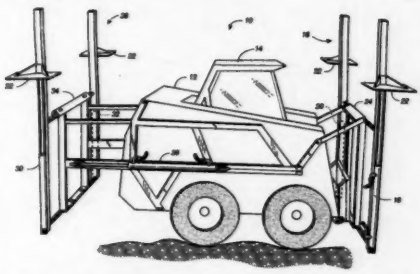
**5,490,568**

## TRACTOR-MOUNTED STAKE DRIVER

**Jose J. Rios, and Mack D. Worland, both of 4890 E. Acampo Rd., Acampo, Calif. 95220**

**Filed Oct. 27, 1993, Ser. No. 143,831**
**Int. Cl.[6] E21B** *7/02*; **E21C** *11/02*
**U.S. Cl. 173—42** **2 Claims**



**1**. A tractor mounted stake driver for simultaneously driving a plurality of stakes into the ground, said tractor mounted stake driver comprising:

a tractor;

a front stake driving assembly mounted to said tractor and including a right front stake driving ram and a left front stake driving ram, each bearing a stake driving plate, joined by a front stake separation adjustment means; and a rear stake driving assembly mounted to said tractor and including a right rear stake driving ram and a left rear stake driving ram, each bearing a stake driving plate, joined by a rear stake separation adjustment means.

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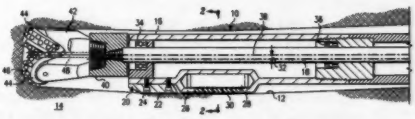
**5,490,569**

## DIRECTIONAL BORING HEAD WITH DEFLECTION SHOE AND METHOD OF BORING

**Jimmy L. Brotherton, Grants Pass, Oreg.; Roger R. Layne, and Cody L. Sewell, both of Perry, Okla., assignors to The Charles Machine Works, Inc., Perry, Okla.**

**Filed Mar. 22, 1994, Ser. No. 215,649**
**Int. Cl.[6] E21B** *7/06*
**U.S. Cl. 175—61** **31 Claims**



**30**. A method for boring a hole with directional control from the surface, comprising the steps of:

simultaneously rotating a casing extending into the hole from the surface and a drill stem extending into the hole from the surface while thrusting the casing and drill stem forward in the hole, the casing having a forward end and the drill stem being mounted to the casing for rotation relative thereto at the forward end, a drill bit being mounted on the drill stem at the forward end;

stopping the rotation of the casing while continuing rotation of the drill stem to form a curved hole, the casing having a deflection shoe thereon at the forward end to deflect the hole.

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**5,490,570**

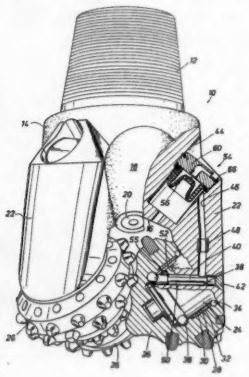
**EARTH BORING BIT AND LUBRICATOR/ COMPENSATOR THEREFOR**

**Stuart C. Millsapps, Jr., Austin, Tex., assignor to Briscoe Tool Company, Houston, Tex.**

**Filed Dec. 1, 1994, Ser. No. 347,823**

**Int. Cl.[6] E21B** *10/24*

**U.S. Cl. 175—228** **13 Claims**



**1**. A well drilling bit comprising:

a bit body including a centralized portion and a plurality of radially and circumferentially spaced legs depending longitudinally from the centralized portion;

a respective cutter body rotatably mounted on the free end of each leg with bearing means cooperative between each leg and the respective cutter body;

wherein the bit body has a respective lubricant passage therethrough communicating with each bearing and with a generally upwardly opening lubricant reservoir recess in the bit body distal the respective bearing; and

a respective lubricating mechanism in each lubricant reservoir recess, each lubricating mechanism comprising

an elastomeric compensator diaphragm extending generally laterally across the respective recess and dividing the recess into a lower zone communicating with the respective lubricant passage and otherwise closed, and an upper zone including an open mouth of the recess, the diaphragm including an annular, peripheral, radially outwardly projecting flange having at least one annular, axially acting, compression spring therein and elastomeric material at least partially covering the spring;

a cap disposed above the diaphragm in the recess for releasably retaining the diaphragm in the recess with the spring at least slightly deflected, and defining a vent communicating the upper zone with the exterior of the bit body;

first seal means cooperative between an underside of the flange and a generally upwardly facing shoulder in the recess, sealing the diaphragm to the bit body in a generally axial direction with respect to the recess;

and second seal means cooperative between an upper side of the flange and a lower, axially facing end surface of the cap, sealing the diaphragm to the cap in a generally axial direction with respect to the recess.

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**5,490,571**

**SUB-ASSEMBLY FOR DUST SUPPRESSION IN ROCK DRILLING**

**David T. Hanns, Belmont, New South Wales, Australia, and Christopher R. Carrall, 12 Mitchell Road, Cardiff, New South Wales, Australia, assignors to Christopher Richard Carrall, Cardiff; David Thomas Hanns, and Jo-Ann Nicol, both of Belmont, all of, Australia**

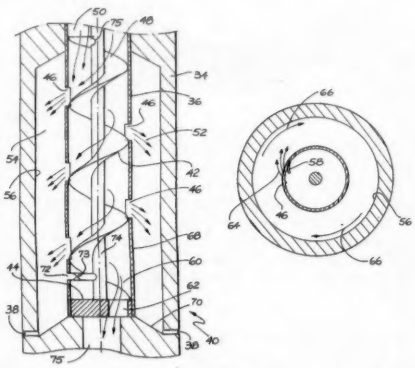
**PCT No. PCT/AU93/00141, § 371 Date Jan. 25, 1995, § 102(e) Date Jan. 25, 1995, PCT Pub. No. WO93/20331, PCT Pub. Date Oct. 14, 1993**

**PCT Filed Apr. 1, 1993, Ser. No. 313,266**

**Claims priority, application Australia, Apr. 1, 1992, PL1648**

**Int. Cl.[6] E21B** *17/18;17/22;21/14;* **E21C** *7/08*

**U.S. Cl. 175—323** **8 Claims**



**1**. A dust suppression sub-assembly for a rock drill comprising:

means to secure the sub-assembly into a drill string;

an outer housing and an inner housing;

a helical path extending through the interior of the inner housing;

inlet means for a gas and liquid flushing medium at one end of the sub-assembly, communicating with the helical path;

a plurality of slots at intervals along the inner housing communicating between the interior of the inner housing and a chamber defined between the inner and outer housings;

a plurality of outlets for the liquid in the outer housing adjacent the other end of the sub-assembly; and

exit means for the gas at the other end of the inner housing communicating with the helical path.

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**5,490,572**

**BATTERY TEMPERATURE CONTROL SYSTEM IN ELECTRIC AUTOMOBILE**

**Akihiro Tajiri; Yoshihiko Hotta; Mitsuru Ishikawa; Choji Sakuma, and Nobuyuki Yuri, all of Saitama, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan**

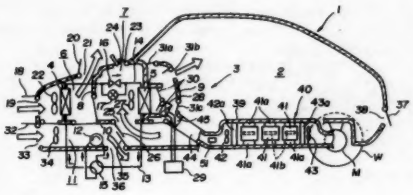
**Filed Dec. 4, 1992, Ser. No. 986,124**

**Claims priority, application Japan, Dec. 4, 1991, 3-347727**

**Int. Cl.[6] B62D** *25/00*

**U.S. Cl. 180—65.1** **25 Claims**

**1**. A battery temperature control system in an electric automobile equipped with an air-cooling device for supplying cool air into a passenger compartment, which automobile travels by using an electric motor as the driving force and a battery as an electric power source for the electric motor, comprising;



a battery chamber separate and isolated from the passenger compartment with the battery mounted in said battery chamber,

a battery temperature sensor for detecting a temperature of said battery,

a control unit for driving said air-cooling device when the battery temperature detected by said battery temperature sensor is higher than a predetermined temperature, and

a temperature-conditioned air intake port provided in said battery chamber and connected through a duct to said air-cooling device for introducing cool air supplied from said air-cooling device directly into said battery chamber and separately from the passenger compartment.

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**5,490,573**

**WINDSHIELD APPARATUS FOR A MOTORCYCLE**

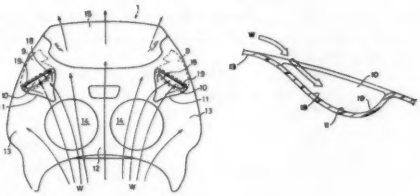
**Shinji Hagiwara; Kouichi Kobayashi; Kouji Shimokawa, and Kenichi Nishimoto, all of Saitama, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed Sep. 22, 1994, Ser. No. 310,323**

**Claims priority, application Japan, Sep. 22, 1993, 5-261652**

**Int. Cl.[6] B60K** *11/00*

**U.S. Cl. 180—68.1** **17 Claims**



1. An ambient air supply for a motorcycle engine comprising:

a windshield adapted for covering a front portion of a motorcycle body, said windshield having a center portion and outer edge portions;

at least one air inlet opening provided on said windshield;

at least one recessed groove being formed in a surface of said windshield forwardly of said at least one air inlet opening providing a substantially longitudinal air introduction path to said at least one air inlet opening, said at least one recessed groove having a smooth, continuously curved surface in a transverse direction of said air introduction path;

a first portion of said curved surface adjacent the center portion of said windshield being convexly shaped having a first radius of curvature;

a second convexly shaped portion of the curved surface adjacent one of the outer edge portions of said windshield having a second radius of curvature substantially less than said first radius; and

an intake conduit being in communication with said at least one air inlet opening for introducing ambient air to the engine.

**5,490,574**

**HOOD HAVING INTAKE OPENINGS FOR DRAWING AIR FOR A RADIATOR AND AN ENGINE**

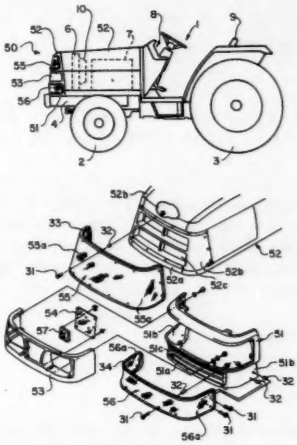
**Seiichi Ishiizumi; Yasuo Nakata; Kazuo Hirata, and Akinori Nakashima, all of Sakai, Japan, assignors to Kubota Corporation, Japan**

**Filed Oct. 7, 1994, Ser. No. 319,830**

**Claims priority, application Japan, Jan. 17, 1994, 6-002917**

**Int. Cl.[6] B60K** *11/08*

**U.S. Cl. 180—68.1** **8 Claims**



1. A hood for enclosing a radiator and an engine, comprising:

a hood grille formed in a front surface of said hood, said hood grille including a front wall, and right and left side walls extending from opposite sides of said front wall, said front wall defining intake openings for drawing in air for said radiator;

hood grille netting extending over an entire area of said intake openings and extending beyond said area of said intake openings covering at least parts of said right and left side walls; and

fixing means for securing said hood grille netting to said hood grille to define spaces between said hood grille netting and said right and left side walls, said spaces communicating with said intake openings.

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**5,490,575**

**ACTIVE SEAT BELT CONTROL SYSTEM WITH BUILT IN INTERIA SENSOR**

**Michael J. Suran, Clarkston, and Michel Trumbo, Troy, both of Mich., assignors to Chrysler Corporation, Highland Park, Mich.**

**Filed Dec. 9, 1994, Ser. No. 352,463**

**Int. Cl.[6] B60R** *22/343;22/41*

**U.S. Cl. 180—270** **7 Claims**

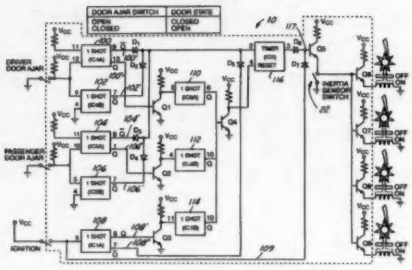
1. An active seat belt control system for controlling the locking and unlocking of a seat belt retractor in a vehicle comprising:

first detection means responsive to the opening and closing of a vehicle door and capable of generating a first output signal indicating the state of said door,

second detection means responsive to the on/off state of an ignition switch and capable of generating a second output signal indicating the state of said ignition switch,

first control means responsive to said first output signal and said second output signal and capable of generating a third output signal,

timer means for starting a timing sequence for a preset time period when triggered by said third output signal,



impact sensing means built-in with said control system responsive to a sudden vehicle motion for generating a fourth output signal, and

second control means responsive to said third output signal of said timer means, for enabling the unlocking of said seat belt retractor for said preset time period, said second control means also responsive to said fourth output signal for overriding said third output signal and locking said seat belt retractor for the duration of said fourth output signal.

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**5,490,576**

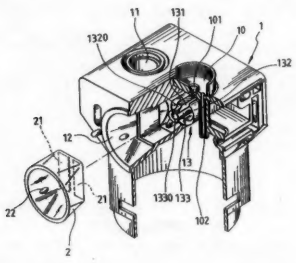
**AIR PRESSURE ADJUSTING MODULE HAVING VARIABLE BLADE DEVICE OF INDEPENDENT STRUCTURE**

**Fu-Shiang Huang, 46-1 Kan-Tou, 3 Lin, Jui-Chin Chun, Shin-Feng Hsiang, Hsing-Chu Hsien, Taiwan, Prov. of China**

**Filed Jan. 12, 1995, Ser. No. 371,970**

**Int. Cl.[6] F16N** *7/34*

**U.S. Cl. 184—55.2** **3 Claims**



**1**. An oil atomizing device to lubricate pressurized air in a compressed air system, the device comprising: an oil supply cup; a nozzle; an oil guiding tube connected between said nozzle and said cup to direct oil from said cup to said nozzle; a chamber having an air inlet extending from the chamber to the exterior of the device, the air inlet having a circular shape; a conical flow guide mounted in the chamber having a flow guide air inlet of circular configuration and a flow guide air outlet of square configuration; a plurality of resilient flaps located at the air flow guide outlet; a lateral wall of the flow guide and chamber having aligned holes communicating with the cup, such that the conical shaped flow guide causes a portion of compressed air in the flow guide to flow into the cup containing oil when compressed air passes through the nozzle, such that the lubrication air can be smoothly sucked out.

**5,490,577**

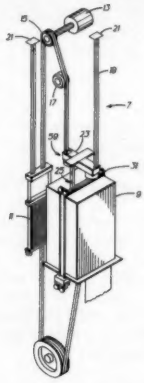
**FLEXIBLE ELEVATOR HITCH**

**Young S. Yoo, Avon, Conn., assignor to Otis Elevator Company, Farmington, Conn.**

**Filed Jun. 22, 1994, Ser. No. 263,864**

**Int. Cl.[6] B66B** *11/08*

**U.S. Cl. 187—252** **7 Claims**



**1**. A flexible elevator hitch having a car suspended by ropes, said elevator hitch comprising:

a sheave for receiving said ropes,

a structure for rotatably supporting said sheave, and

a flexible member for attaching said structure to said car, said flexible member minimizing transference of moments from said structure to said car.

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**5,490,578**

**STRUCTURE FOR ATTACHING ELEVATOR MACHINERY IN A BUILDING**

**Esko Aulanko, Kerava; Jorma Mustalahti, and Harri Hakala, both of Hyvinkää, all of, Finland, assignors to Kone Oy, Helsinki, Finland**

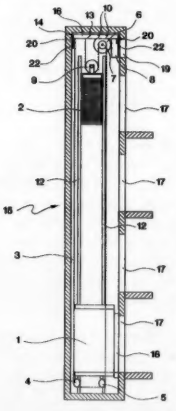
**Filed Jun. 27, 1994, Ser. No. 266,181**

**Claims priority, application Finland, Jun. 28, 1993, 932977; May 25, 1994, 942432**

**Int. Cl.[6] B66B** *11/08*

**U.S. Cl. 187—254** **8 Claims**

**1**. An apparatus attaching elevator machinery to an elevator shaft



comprising:

an elevator shaft;

a mounting beam having two ends with each end solely fixed to opposite side walls of the elevator shaft and at a top portion of the elevator shaft; and

elevator machinery including a motor, having a top portion, which top portion is directly attached to the mounting beam.

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**5,490,579**

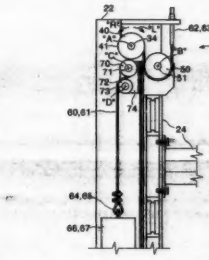
## TANKER ACCESS PLATFORM

**Ralph D. Ratcliffe, Oakville, and Roelof Van Der Sleen, Mississauga, both of, Canada, assignors to Preventative Maintenance Systems, Oakville, Canada**

**Filed Jun. 10, 1994, Ser. No. 258,861**

**Int. Cl.[6] B66B** *11/08*

**U.S. Cl. 187—266** **14 Claims**




1. A height adjustable tanker access platform system having a fixed frame member, an access platform operatively mounted on said fixed frame member for vertical movement with respect to said fixed frame member, and a drive mechanism operatively engaged between said fixed frame member and said access platform so as to provide means for raising and lowering said access platform, said drive mechanism comprising:

a drive means securely mounted on a selected one of said fixed frame member and said access platform;

a drive pulley operatively connected to said drive means to permit selective driven rotation of said drive pulley about a first rotational axis;

a main idler pulley rotatably mounted on the other of said fixed frame member and said access platform for rotation about a second rotational axis; and

a first drive cable securely attached at an anchored end to said fixed frame member and securely attached at an opposite remote end to a vertically movable counter-weight, said first drive cable being looped around said main idler pulley and looped in drivable engagement around said drive pulley such that rotation of said drive pulley causes corresponding movement of said first drive cable, so as to thereby cause said access platform to be vertically moved with respect to said fixed frame member;

wherein said drive pulley has a first "V"-shaped groove disposed around the periphery thereof, wherein said first "V"-shaped groove forms an angle of between about 40° and about 70° so as to receive said first drive cable in releasable binding relation therein.

**5,490,580**

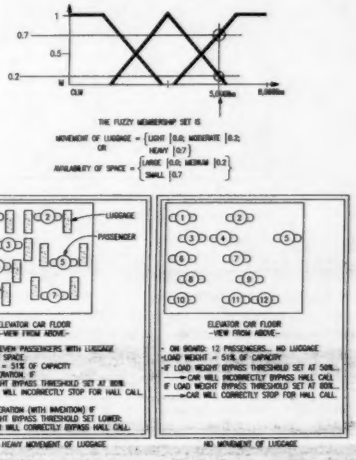
## AUTOMATED SELECTION OF A LOAD WEIGHT BYPASS THRESHOLD FOR AN ELEVATOR SYSTEM

**Bruce A. Powell, Canton, and Joseph C. Walker, Avon, both of Conn., assignors to Otis Elevator Company, Farmington, Conn.**

**Continuation of Ser. No. 44,334, Apr. 7, 1993. This application Apr. 17, 1995, Ser. No. 425,662**

**Int. Cl.[6] B66B** *1/44; 1/18*

**U.S. Cl. 187—281** **10 Claims**


1
0.7
0.5
0.2
M
CLW
THE FUZZY MEMBERSHIP SET IS
MOVEMENT OF LUGGAGE = {LIGHT | 0.0; MODERATE | 0.2; OR HEAVY | 0.7}
AVAILABILITY OF SPACE = {LARGE | 0.0; MEDIUM | 0.2; SMALL | 0.7}
LUGGAGE
PASSENGER
ELEVATOR CAR FLOOR -VIEW FROM ABOVE-
• ON BOARD: SEVEN PASSENGERS WITH LUGGAGE
• NO AVAILABLE SPACE
• LOAD WEIGHT = 51% OF CAPACITY
OPERATION, IF
LOAD WEIGHT BYPASS THRESHOLD SET AT 80%
→ CAR WILL INCORRECTLY STOP FOR HALL CALL.
OPERATION (WITH INVENTION) IF
LOAD WEIGHT BYPASS THRESHOLD SET LOWER:
→ CAR WILL CORRECTLY BYPASS HALL CALL.
ELEVATOR CAR FLOOR -VIEW FROM ABOVE-
• ON BOARD: 12 PASSENGERS... NO LUGGAGE
•LOAD WEIGHT = 51% OF CAPACITY
•IF LOAD WEIGHT BYPASS THRESHOLD SET AT 50%...
→ CAR WILL INCORRECTLY BYPASS HALL CALL
IF LOAD WEIGHT BYPASS THRESHOLD SET AT 80%...
→ CAR WILL CORRECTLY STOP FOR HALL CALL.
HEAVY MOVEMENT OF LUGGAGE
NO MOVEMENT OF LUGGAGE

1. An electronic computerized arrangement for selecting an elevator load weight bypass threshold, comprising:

an electronic computer including a memory;

a plurality of elevator load weight bypass thresholds stored within said memory; and

instructions for selecting one of said elevator load weight bypass thresholds from among said plurality, the selection being dependent upon a time of day that said instructions are executed by said electronic computer and upon an estimated amount of floor space available within an elevator car, said instructions being stored within said memory, said estimated amount of floor space available corresponding to a point of a fuzzy function, said fuzzy function being stored within said memory, said memory further including instructions for controlling the elevator car to bypass a hall call while a load in the elevator car exceeds a selected one of said elevator load weight bypass thresholds.

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**5,490,581**

## SURFACE MOUNTED MODULAR FIXTURE FOR ELEVATORS

**Donald B. Warner, Glenview; John T. Andrews, Chicago; Mark D. Menke, Highland Park; Marc A. Cooperman, Lindenhurst, and Jan Tornes, Des Plaines, all of Ill., assignors to Inventio AG, Hergiswil NW, Switzerland**

**Filed Sep. 23, 1994, Ser. No. 311,179**

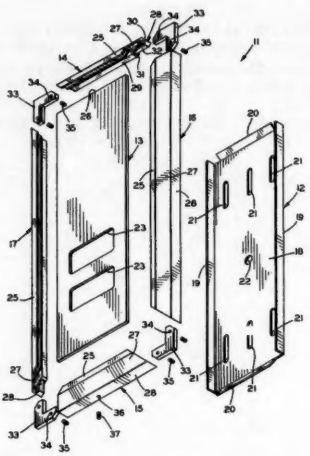
**Int. Cl.[6] B66B** *7/00*

**U.S. Cl. 187—414** **20 Claims**

1. A surface mounted fixture for elevators having at least one indicating device mounted therein to signal an operational state of an associated elevator comprising:

a generally planar face plate having edges and at least one aperture formed therein for receiving the indicating device;

a frame surrounding said edges of said face plate and releasably retaining said face plate, said frame and said face plate forming a box-like housing having side walls extending rear-



wardly from said face plate and an open rear side for facing toward a wall surface;

a generally planar base plate having upper and lower end edges and means for attachment to the wall surface, said base plate being sized for insertion into said open rear side of said housing; and

means for detachably coupling said frame to said base plate at said open rear side of said housing whereby when said base plate is attached to the wall surface, said upper and lower end edges of said base plate extend into said open rear side of said housing, said means for detachably coupling releasably engages said upper and lower end edges of said base plate and said housing encloses and covers said base plate in cooperation with the wall surface.

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**5,490,582**

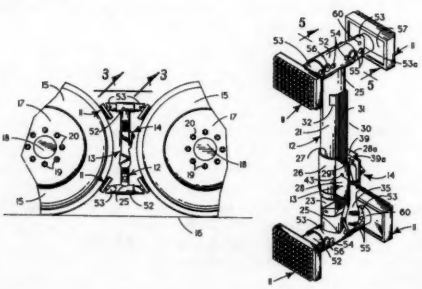
**LOCKING CHOCK FOR TANDEM WHEELED VEHICLES**

**Gerald D. Trowbridge, 34485 Highway 93, St. Ignatius, Mont. 59865**

**Filed Jan. 23, 1995, Ser. No. 376,221**

**Int. Cl.[6] B60T** *1/04*

**U.S. Cl. 188—2 R** **8 Claims**



7. A locking wheel chock to prevent the relative rotation of adjacent, aligned tandem wheels carried on spaced axles of a vehicle, comprising in combination:

an elongate compound body having inner and outer body tubes slidable relative to each other, each body tube carrying at its end distal from the other a wheel block to simultaneously contact the circular peripheries of adjacent tandem wheels;

an elongate rack carried by the inner body tube and extending over the outer body tube, said rack defining a plurality of spaced teeth on its surface distal from the inner tube body supporting it;

fastening means including a fastening bracket carried by the outer body tube pivotally carrying a fastening lever defining at one inner end portion a segment of a pinion having teeth to operatively engage the teeth of the rack and a medial fastening catch, said lever being pivotal from a first non-fastening position to a second fastening position to move the body portions together responsive to the pivotal position of the fastening lever.

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**5,490,583**

**MAGNETICALLY-OPERABLE BRAKE DEVICE**

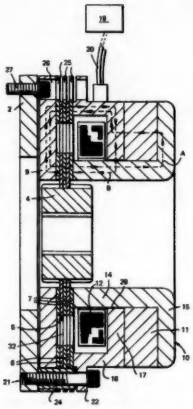
**Peter Anderson, and Stuart J. Inglis, both of Angus, Scotland, assignors to TI Matrix Engineering Limited, Scotland, United Kingdom**

**Filed Feb. 9, 1994, Ser. No. 193,840**

**Claims priority, application United Kingdom, Feb. 10, 1993, 9302623**

**Int. Cl.[6] H02K** *49/10*

**U.S. Cl. 188—161** **1 Claim**



1. The A method of operating a magnetically operable braking device comprising the steps of:

providing a permanent magnet to cause said braking device to apply a braking force,

energizing an electromagnet to oppose said action of said permanent magnet,

further energizing said electromagnet so as to cancel said action of said permanent magnet, and

increasing the energization of said electromagnet beyond the point at which it cancels said action of said permanent magnet to cause said braking device to apply a braking force.

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**5,490,584**

**EDDY CURRENT BRAKE EQUIPMENT WITH TORQUE ESTIMATION**

**Michel Estaque, Taverny, and Philippe Gernot, Suresnes, both of, France, assignors to Labavia - S.G.E., Saint Quentin En Yvelines Cedex, France**

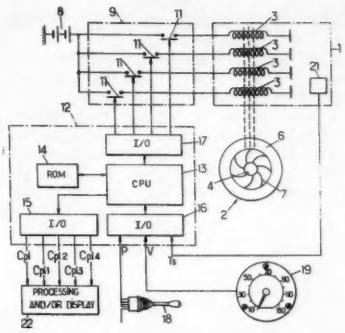
**Filed Dec. 20, 1994, Ser. No. 360,138**

**Claims priority, application France, Dec. 23, 1993, 93 15584**

**Int. Cl.[6] H02P** *15/00;* **B60L** *7/28*

**U.S. Cl. 188—164** **10 Claims**

1. Eddy current brake equipment for a vehicle, the brake equipment comprising a stator assembly and a rotor assembly adapted to




be mounted on a transmission shaft of a vehicle, one of said assemblies including inductor windings and the other assembly including an armature facing the inductor windings, the brake equipment also including excitation means for selectively exciting the inductor windings from an electricity source of the vehicle in response to a power feed setting, and processor means to estimate the braking torque that can be provided by the equipment as a function of the speed of rotation of the rotor assembly, of the temperature of the armature, of the temperature of the inductor windings, and of at least one value for the power feed setting.

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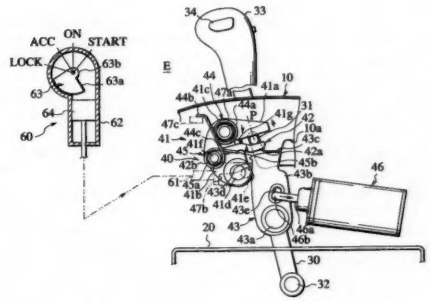
**5,490,585**

## SHIFT LEVER APPARATUS

**Norio Togano, c/o Fujikiko Kabushiki Kaisha, Washizu-kojyo, 2028 Washizu, Kosai-shi, Shizuoka-ken, Japan**

**Filed Nov. 30, 1994, Ser. No. 347,263**
**Claims priority, application Japan, Nov. 30, 1993, 5-299617**
**Int. Cl.[6] B60K** *41/28*
**U.S. Cl. 192—4 A** **8 Claims**




**1**. A shift lever apparatus, comprising:

a shift lever (**30**) having a position pin (**31**) shifted between a park position (P) and drive positions;

a shift lever lock mechanism (**40**) for locking the position pin located at the park position having:

a key lock lever (**41**) formed with a first arm portion (**41***a*) and a second arm portion (**41***b*);

a support lever (**42**) pivotally supported by the second arm portion (**41***b*) of the key lock lever and formed with an end arm portion (**42***a*), the position pin (**31**) being pinched between the first arm portion (**41***a*) of the key lock lever (**41**) and the end arm portion (**42***a*) of the support lever (**42**);

first urging means (**44**) for urging the first arm portion (**41***a*) of the key lock lever (**41**) toward the position pin;

second urging means (**45**) for urging the end arm portion (**42***a*) of the support lever (**42**) toward the position pin; and

a lock lever (**43**) associated with the key lock lever (**41**) to lock the position pin located at the park position;

an actuator (**46**) for selectively pivoting the lock lever (**43**) between lock and unlock positions of the position pin located at the park position; and

a key interlock mechanism (**60**) driven by an engine key and linked with the second arm portion (**41***a*) of the key lock lever (**41**) via a key lock cable (**61**).

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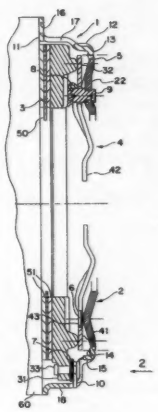
**5,490,586**

## COVER PLATE FOR A DIAPHRAGM CLUTCH, ESPECIALLY FOR A MOTOR VEHICLE

**Gilbert Junot, Vers Sur Selle, and Pierre Warnke, Amiens, both of, France, assignors to Valeo, Paris, France**

**Filed May 10, 1994, Ser. No. 240,594**
**Claims priority, application France, May 11, 1993, 93 05649**
**Int. Cl.[6] F16D** *13/58*
**U.S. Cl. 192—89.23** **9 Claims**



**1**. An annular, dished, metallic cover plate for a diaphragm clutch, said cover plate comprising a base, oriented generally transversely with respect to the rotational axis of the clutch, an annular skirt oriented generally axially with respect to said axis, and a junction zone joining said base and skirt together, wherein the cover plate comprises two parts, namely a first part comprising said skirt and junction zone having an inner periphery, which are integral with each other, and a second part comprising a base of the cover plate having an outer periphery and oriented generally transversely with respect to said axis, said first and second parts defining a welded joint therebetween whereby they are welded to each other and wherein the base is generally comprised of a thicker material than material which comprises the junction zone.

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**5,490,587**

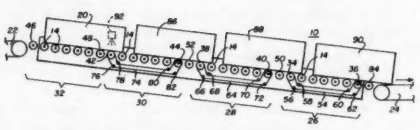
## GRAVITY ACCUMULATION CONVEYOR APPARATUS

**Andrew Fisher, Planlo, Tex., assignor to Recot, Inc., Wilmington, Del.**

**Continuation of Ser. No. 135,681, Oct. 12, 1993, abandoned.**
**This application Feb. 13, 1995, Ser. No. 387,371**
**Int. Cl.[6] B65G** *13/00*
**U.S. Cl. 193—35 A** **10 Claims**

**1**. A gravity accumulation conveyor apparatus for transporting objects from an upstream end down an incline to a downstream end under the influence of gravity as the object traverses a plurality of rollers, the apparatus comprising:

at least one roller zone forming the conveyor apparatus, the at least one roller zone including at least three rollers and having



an upstream roller and a spaced downstream roller separated by at least one roller; and

connection means in continuous mechanical engagement with only the upstream roller and the spaced downstream roller in the at least one roller zone so as to bypass the at least one separating roller such that the connection means moves only the upstream roller and the downstream roller together in substantial synchronism whereby when a first object is stopped on the downstream roller, a second object engaging the upstream roller also tends to be stopped and, when the first object moves on the downstream roller, the second object engaging the upstream roller is caused to move.

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**5,490,588**

## COIN PROCESSING APPARATUS

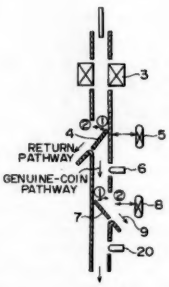
**Kenji Nishiumi, Hanno; Toshio Osawa, Fujimi; Kanesue Shimizu, and Shinichi Machida, both of Sakado, all of, Japan, assignors to Nippon Conlux Co., Ltd., Tokyo, Japan**

**Filed Dec. 20, 1993, Ser. No. 170,552**

**Claims priority, application Japan, Dec. 21, 1992, 4-340646; Jan. 18, 1993, 5-005709**

**Int. Cl.[6] G07D** *5/08;* **G07F** *1/04*

**U.S. Cl. 194—317** **5 Claims**




1. In a coin processing apparatus wherein the quality and dimensions of a coin that is inserted through an insertion slot are electromagnetically tested by a testing portion as said inserted coin passes along a predetermined pathway, said inserted coin is sent along either a genuine-coin pathway or a counterfeit-coin pathway by the operation of a first pathway switching mechanism in accordance with the results of said testing and an acceptance enabling/disabling decision, then said coin is sent along either a cash-box pathway or a change tube pathway by the operation of a second pathway switching mechanism in accordance with a coin type obtained from the results of said testing, wherein said change tube pathway is divided into separate tube pathways for each coin type, a coin processing apparatus characterized in being provided with:

a first pass sensor which is provided in said genuine-coin pathway between said first pathway switching mechanism and said second pathway switching mechanism, and which detects the passing of said inserted coin; and

a second pass sensor which is provided in said change tube pathway in the vicinity of said second pathway switching mechanism, and which detects the passage of said coin through said change tube pathway to generate a detection signal;

wherein the operation by said second pathway switching mechanism of sending said inserted coin into said change tube pathway is halted until the detection signal falls.

**5,490,589**

## APPARATUS FOR TRANSPORTING MASS FLOWS OF ARTICLES

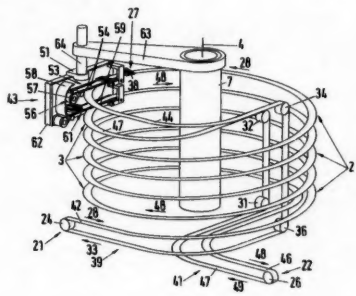
**Peter Golz, Seevetal; Andreas Rinke, Bad Oldesloe, and Jürgen Krössmann, Schwerin, all of, Germany, assignors to Hauni Maschinenbau AG, Hamburg, Germany**

**Division of Ser. No. 157,222, Nov. 23, 1993, Pat. No. 5,413,213, which is a continuation-in-part of Ser. No. 97,937, Jul. 26, 1993, abandoned. This application Jan. 13, 1995, Ser. No. 372,663**

**Claims priority, application Germany, Jul. 25, 1992, 42 24 609**

**Int. Cl.[6] B65G** *47/26*

**U.S. Cl. 198—444** **12 Claims**



1. Apparatus for transporting articles between two stations, comprising article transferring means including at least one elongated conveyor and a second conveyor, said at least one elongated conveyor having an article receiving portion at one of said stations, an article discharging portion at the other of said stations, and an elongated article advancing section between said portions; guide means defining for said article advancing section at least a portion of an elongated path extending between said stations, said guide means comprising a first helical track and a second helical track and said at least one elongated conveyor of said article transferring means extending along one of said tracks away from said one station in a first direction, said at least one elongated conveyor of said article transferring means further having a second section extending toward said one station and said second conveyor of said article transferring means having an article advancing section extending to said other station along the other of said tracks and in a second direction at least substantially counter to said first direction, said second conveyor of said article transferring means further having a second section extending from said other station to an inlet of said second track; and means for varying the length of the path for advancement of articles between said stations, said means for varying comprising a bridge including a conveyor having means for accepting articles from the article advancing section of said at least one conveyor of said article transferring means and means for delivering articles from said accepting means to the article advancing section of said second conveyor of said article transferring means.

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**5,490,590**

## CHAIN WEAR MONITOR

**David Courtney, 29102 Glenwood Rd., Perrysburg, Ohio 43551**

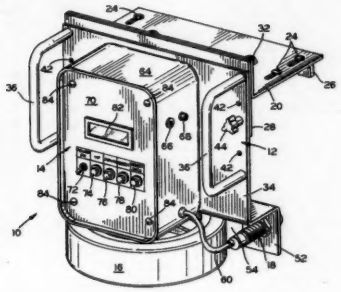
**Filed Mar. 17, 1995, Ser. No. 406,375**

**Int. Cl.[6] B65G** *43/00*

**U.S. Cl. 198—502.4** **16 Claims**

1. A chain wear monitor mounted on a chain drive system for counting a selected number of links in a section of chain and simultaneously measuring the length of the section of chain during regular operation of the chain drive system, said monitor comprising:

a) a mounting bracket for positioning said bracket adjacent a chain on a chain drive system;



b) a sensor positioned on said mounting bracket for sensing links in the chain as the chain drive system pulls the links pass said sensor, said sensor generating a counting signal in response to the links;

c) a measuring wheel positioned adjacent said counting sensor and rotatably connected to a shaft mounted on said bracket such that the links in the chain engage and drive said measuring wheel as the chain drive system pulls the chain;

d) an encoder connected to the shaft of said measuring wheel for generating a distance signal as the measuring wheel rotates;

e) a controller electrically connected to said counting sensor and said encoder for receiving the counting signal and the distance signal, said controller calculating a distance measurement per selected number of links in a section of chain, and generating a corresponding output signal; and

f) an output means for receiving the output signal and for indicating the distance per section of chain and other calculated data.

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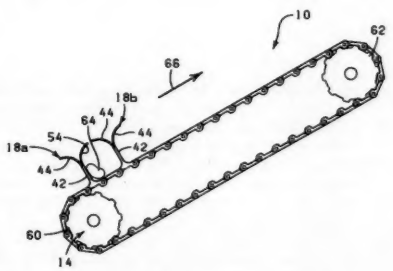
**5,490,591**

## CONVEYOR WITH CLEATS HAVING A PRODUCT-CARRYING SURFACE AND AN OPPOSITE PRODUCT-RELEASING SURFACE

**William G. Faulkner, 6701 Newman Dr., Oklahoma City, Okla. 73162**

**Filed Jan. 4, 1995, Ser. No. 368,198**
**Int. Cl.[6] B65G** *47/38*
**U.S. Cl. 198—803.13** **8 Claims**



**1**. A conveyor comprising:

an endless loop having a transfer end, a return end, a product-receiving point and a product-releasing point;

means for rotating the endless loop; and

a plurality of cleats extending outwardly from the endless loop in spaced arrangement and having one side with a product-carrying surface and an opposite side with a product-releasing surface, each one of the cleats comprising:

a base having a first side and a second side;

a flight extending from the base between the first side and the second side of the base, the flight having a first bend proximate to the base and a second bend distal from the base, the first bend and the second bend being substantially reverse to one another, the first bend defining the product-carrying surface and the second bend defining the product-releasing surface of the cleat;

wherein product items disposed between each pair of first and second adjacent cleats shifts by gravity from between the first and second cleats to the product-releasing surface of the second cleat at the transfer end of the endless loop and wherein the product items slide by gravity from the product-releasing surface of the second cleat when the second cleat rotates to the product-releasing point of the conveyor.

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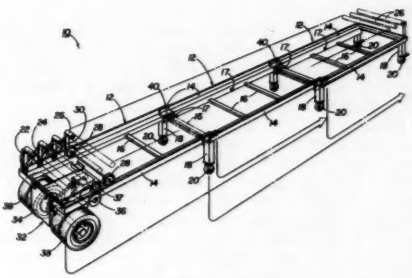
**5,490,592**

## TELESCOPING RIGID FRAME AND SCISSOR CONVEYOR

**John W. Best; Bob K. Flippo; James D. Walker, and Gary D. Carter, all of Jonesboro, Ark., assignors to Northstar Industries, Inc., Jonesboro, Ark.**

**Filed Dec. 5, 1994, Ser. No. 349,268**
**Int. Cl.[6] B65G** *21/14*
**U.S. Cl. 198—812** **19 Claims**



**1**. An expandable conveyor, comprising:

a. A plurality of frame segments, each comprising:

(1) at least one pair of legs, each leg including at least one wheel;

(2) a pair of channels connected to the legs, each channel dimensioned to receive and nest with channels from adjacent frame segments, so that the frame segments may be telescoped into one another;

(3) at least one linking member connecting the channels;

b. a lazy tongs conveyor structure disposed on the frame segments, comprising;

(1) a pair of expandable lazy tong structures, each connected to a plurality of rollers adapted to be received by the channels of the frame segments so that each lazy tong structure rides atop a channel of a frame segment; and

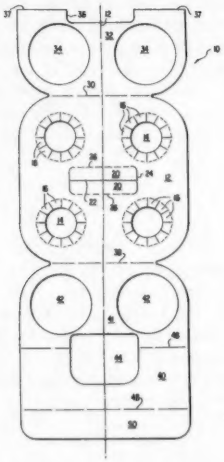
(2) a plurality of conveyor rollers, each connecting an upper connection in a lazy tong structure to a corresponding upper connection in the other lazy tong structure in the pair; the lazy tongs conveyor structure adapted to ride atop the frame structure in order to expand as the frame segments are unnested and contract as the frame segments are nested, but at any desired length of the conveyor, to function as an expandable roller conveyor.

**5,490,593**

## GLASS BOTTLE CARRIER WITH DIVIDER

**Robert L. Gordon, Monroe, and Linda A. Bernstein, Campbell Hall, both of N.Y., assignors to International Paper Company, Purchase, N.Y.**

**Filed Oct. 19, 1994, Ser. No. 325,011**
**Int. Cl.[6] B65D** *5/48*
**U.S. Cl. 206—157** **7 Claims**



**1**. A bottle carrier for carrying glass bottles, said carrier fashioned from a unitary blank of paperboard and having a main panel, said main panel having a plurality of glass bottle receiving openings with each said opening having resilient fingers therearound, said main panel having a human finger receiving opening, said human finger receiving opening having a longitudinal axis, said main panel having a first reinforcing panel foldably secured thereto along one edge of said main panel, said first reinforcing panel having a divider panel foldably secured thereto, said divider panel lying in a plane at right angles to said main panel, said divider panel having a plane which substantially divides said main panel into two identical halves, said main panel finger receiving opening longitudinal axis lying in said plane of said divider panel, said divider panel having a human finger receiving opening in its said plane.

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**5,490,594**

## GOLF BAG COVER

**James O. Rupe, P.O. Box 562, West Liberty, Ky. 41472**

**Filed Jan. 17, 1995, Ser. No. 372,926**
**Int. Cl.[6] A63B** *55/00;57/00*
**U.S. Cl. 206—315.4** **14 Claims**

**6**. A golf bag cover in combination with a golf bag for carrying golf clubs comprising:

a flexible sheath having a front wall, a rear wall, and means joining said front wall to said rear wall to define a top portion and a bottom portion;

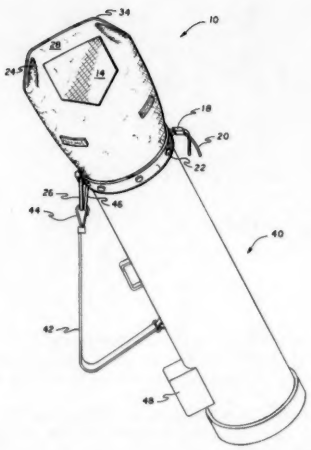
said flexible sheath further having a first closed end at the top portion and a second open end at the bottom portion;

said bottom portion of said rear wall including at least two releasable first cooperating fasteners;

said top portion of said rear wall including at least two second releasable cooperating fastener which cooperate with said releasable first fasteners in said bottom portion;

said flexible sheath is folded to a flattened configuration by engaging said two releasable first cooperating fasteners on said bottom portion with said two releasable second cooperating fasteners on said top portion; and

storing said folded sheath in a side pocket of said golf bag.



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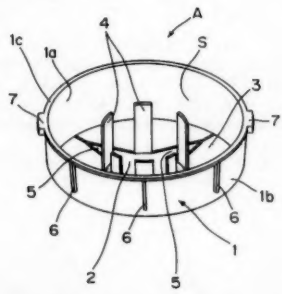
**5,490,595**

## BUNDLE-OF-ELECTRIC WIRE CONTAINER

**Koji Sakai, and Akio Shirata, both of Kanazawa, Japan, assignors to Sumitomo Wiring Systems, Ltd., Mie, Japan**

**Filed Jun. 6, 1994, Ser. No. 254,753**
**Claims priority, application Japan, Jun. 11, 1993, 5-031460 U**
**Int. Cl.[6] B65D** *85/06;85/04*
**U.S. Cl. 206—408** **9 Claims**



**1**. A single-piece container for containing a bundle of electric wire wound in a loop shape, the container having an inner perimeter and an outer perimeter and comprising:

a base having a circular outer edge having an outer perimeter for defining an outer perimeter of a bundle of electric wire mounted on the base, and a surrounded portion surrounded by the outer edge, the surrounded portion having a center hole formed therein;

a core extending upward from an edge of the center hole of the base for holding an inner peripheral portion of said bundle of electric wire mounted on the base, the core including a plurality of core pieces; and

an outer cylinder extending upward from the outer edge of the base, the outer cylinder opening upward and surrounding the core to define an annular bundle-of-electric wire containing space between the outer cylinder and the core, the outer cylinder having a height and having a diameter in its lower portion that is smaller than that in its upper portion so that a plurality of like bundle-of-electric wire containers can be stacked in a plurality of upper and lower stages while each contains a bundle of electric wire therein.

the base including means defining grooves which are substantially triangular, the grooves being formed between the core pieces and extending radially outward from connection with the center hole,

the grooves receiving the core piece of a lower stage container if the container is stacked in a plurality of stages with such lower stage container.

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**5,490,596**

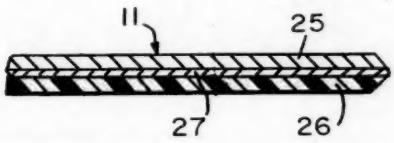
**AUTOCLAVE BAG**

**Jay Katz, 56627 Arch Ct., Elkhart, Ind. 46516**

**Filed Jan. 10, 1995, Ser. No. 370,326**

**Int. Cl.[6] A61B** *19/02*

**U.S. Cl. 206—439** **10 Claims**




1. A reusable, flexible bag for holding surgical instruments to be subjected to autoclaving temperatures, comprising:

an outer ply in the form of a mesh fabric made of synthetic polymeric material and having interstices formed throughout the mesh,

an inner ply in the form of a continuous film of flexible synthetic polymeric material resistant to the passage of moisture therethrough and to inadvertent penetration by instruments contained therewithin, and

an intermediate ply in the form of an adhesive layer having high sheer strength, long-term holding power, and resistance to liquefaction at autoclaving temperatures, said intermediate ply bonding said outer and inner plies together and augmenting said bond by entering the interstices in the mesh of said outer ply, so that surgical instruments placed within said bag will be autoclaved without puncture of the bag or subjecting the contents of the bag to loss of sterility by exposure to moisture after said autoclaving has been completed.

6. A reusable, flexible, elongated bag for the insertion and removal of surgical instruments through an open end thereof, said bag and said instrument being subjected to autoclaving temperatures, comprising

an outer ply in the form of a mesh fabric made of synthetic polymeric material and having interstices formed throughout the mesh,

an inner ply in the form of a continuous film of flexible synthetic polymeric material resistant to the passage of moisture therethrough and to inadvertent penetration by instruments contained therewithin;

an intermediate ply in the form of an adhesive layer having high sheer strength, long-term holding power, and resistance to liquefaction at autoclaving temperatures, said intermediate ply bonding said outer and inner plies together and augmenting said bond by entering the interstices in the mesh of said outer ply, so that surgical instruments placed within said bag will be autoclaved without puncture of the bag or subjecting the contents of the bag to loss of sterility by exposure to moisture after said autoclaving has been completed, and

closure means located at said open bag end so that said bag can be sealed against ingress of moisture while it is subjected to autoclaving temperatures.

**5,490,597**

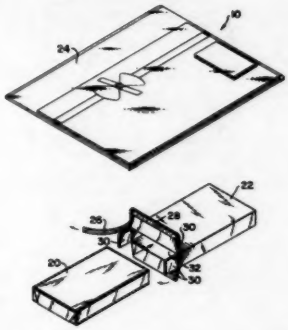
**GIFT PACKAGING AND WRAPPING ENSEMBLE**

**Allen Schluger, 21 W. 68th St., New York, N.Y. 10023**

**Filed Mar. 1, 1994, Ser. No. 203,308**

**Int. Cl.[6] B65D** *71/00*

**U.S. Cl. 206—575** **1 Claim**




1. As an article of manufacture, a kit for wrapping a product as a gift of a type including gift-wrapping components having a flat planar configuration characterized by four straight sides bounding a rectangular area of a selected size in a point-of-sales display in a compartment formed by an external wrap of clear plastic construction material, said gift wrapping components including a gift box collapsed into a flat planar configuration and foldable therefrom into a three dimensional configuration, the improvements to said kit comprising as an inclusion within said compartment a mailing box of cardboard construction material of a type foldable from a flat planar condition into a three dimensional configuration, said mailing box in said flat planar condition being similarly characterized by four straight sides bounding said same sized rectangular shape as said kit, whereby said mailing box effectively serves both as a flat support base in said kit during a covering relation thereover of said external wrap of clear plastic and upon removal of said plastic wrap as a usable three dimensional gift-wrapping component which encloses said gift box for mailing.

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**5,490,598**

**SCREEN FOR VIBRATING SEPARATOR**

**Thomas C. Adams, Hockley, Tex., assignor to Drexel Oilfield Services, Inc., Conroe, Tex.**

**Filed Mar. 30, 1994, Ser. No. 220,101**

**Int. Cl.[6] B07B** *1/49*

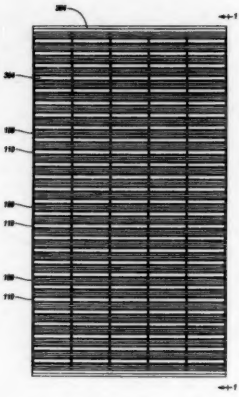
**U.S. Cl. 209—401** **22 Claims**

11. A screen for a separator comprising:

a first web of wire mesh;

a second web of wire mesh immediately adjacent to the first web of wire mesh, the first and second webs of wire mesh cooperating to prevent particles having a dimension greater than selected size from passing through the screen;

a support panel formed with a first series of alternating parallel ridges and channels and a plurality of openings; the first web and the second webs being bonded to a surface of the panel around each one of the plurality of openings to create in the first and second webs a second series of alternating ridges and channels complementary with the first series and a plurality of independently supported cells of wire mesh overlaying each of the plurality of openings.



**5,490,599**

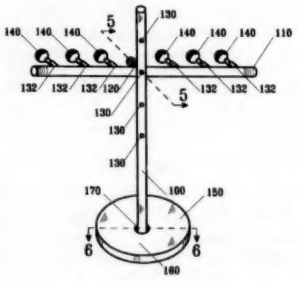
**LONG MULTI-POSITION MICROPHONE SUPPORT STAND**

**Fred F. Tohidi, 10045 Montecito Plz., Garden Grove, Calif. 92640**

**Filed Dec. 23, 1994, Ser. No. 363,683**

**Int. Cl.[6] A47F** *7/00*

**U.S. Cl. 211—171** **20 Claims**



**1**. A multi position microphone support stand assembly for allowing a set of microphones to be securely oriented in a plurality of heights and angles, comprising:

a microphone support stand having an upper end and a lower end;

a microphone support column including a plurality of microphone housing slots, rotably mounted on said microphone support stand; and

a locking means for selectively and releasably securing and positioning said microphone support column at a predetermined orientation, wherein said microphone support stand includes at least one opening therein for receiving the locking means.

**5,490,600**

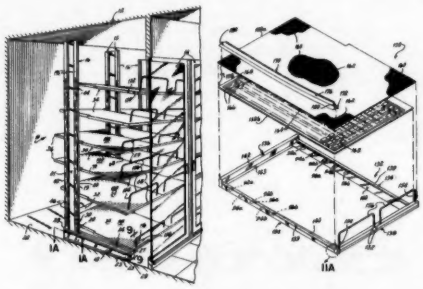
**COOLER DISPLAY RACK WITH ADJUSTABLE GRAVITY FEED SHELVES**

**Rafael T. Bustos, Alpharetta, Ga., assignor to L&P Property Management Company, Chicago, Ill.**

**Continuation-in-part of Ser. No. 16,783, Feb. 11, 1993, Pat. No. 5,333,746. This application Apr. 28, 1994, Ser. No. 234,234**

**Int. Cl.[6] A47F** *5/00*

**U.S. Cl. 211—187** **34 Claims**



**1**. A display rack for providing access to merchandise supported thereon comprising:

plurality of generally upright posts having a top end, a bottom end, a front edge, a rear edge, and a pair of lateral spaced sides;

base means attached to the bottom end of each said post for bracing said post in a generally vertical orientation, said post and said base means forming a generally L-shaped frame section;

connecting means for joining in spaced and generally parallel relation each said frame section to an adjacent said frame section;

at least one shelf extending between an adjacent pair of said posts, said shelf being secured by attachment means for mounting said shelf in a generally cantilever manner between said adjacent pair of posts;

said shelf further comprising:

a frame having a pair of spaced side members connecting a front member spaced from a back member;

a shelf insert supported on said frame, said shelf insert having a slip surface upper layer for gravity feed advance of the merchandise thereon;

a divider attached to an uppermost surface of said slid surface upper layer without being interlocked therewith, said divider projecting upwardly from said slip surface upper layer and extending between said front frame member and said rear frame member to guide the merchandise advancing toward said front frame member, said divider being selectively attachable and detachable from said slip surface upper layer at a plurality of positions on said insert.

**5,490,601**

**DEVICE FOR CONTROLLING THE TRANSFER OF A LOAD SUSPENDED BY CABLES FROM A CARRIAGE MOVABLE IN TRANSLATION IN A LIFTING MACHINE**

**Jean-Marc Heissat, Auxerre, and Jean-Marc Lacour, Osny, both of, France, assignors to Telemecanique, Rueil Malmaison, France**

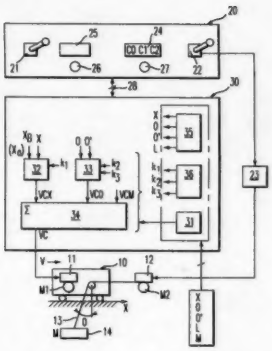
**Filed Nov. 23, 1993, Ser. No. 155,772**

**Claims priority, application France, Nov. 23, 1992, 92 14149**

**Int. Cl.[6] B66C** *19/00*

**U.S. Cl. 212—275** **6 Claims**

**1**. A device for controlling the transfer of a load suspended by one or more cables from a carriage movable in translation in a lifting machine such as a travelling overhead crane or gantry crane comprising:



control and dialogue means at the disposal of a machine operator;

at least one horizontal travel motor associated with said carriage;

means for sensing the suspension height, the sway angle and the angular speed of the load and the linear position of the carriage to provide respective signals L, θ, θ', X; and

a speed control system which, according to signals received from said sensing means, procures movement of the carriage minimizing load sway, said speed control system comprising:

a carriage position corrector for receiving the measured position signals X and a target position value $X_B$ and for delivering an offset value relative to target position ΔX weighted by a gain $k_1$,

a sway angle corrector for receiving the measured sway angle signal θ and a respective angular speed signal θ' and for assigning respective weighting values $k_2$, $k_3$ to said sway angle signal and said angular speed signal,

a computing unit for determining by real time interpolation the values of the gains $k_1$, $k_2$, $k_3$ according to the suspension height signal L, and

a summing unit for summing the offset value, the weighted sway angle signal, and the weighted angular speed signal, for delivering a speed set point signal $VC=k_1\Delta X+k_2\theta+k_3\theta'$ to a variable speed drive associated with a carriage displacement motor.

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**5,490,602**

**COMPOSITE STRUCTURE MANUFACTURE**

**Robert S. Wilson, Belfast, and Mark A. Braniff, Bangor, both of, Northern Ireland, assignors to Short Brothers PLC, Belfast, Northern Ireland**

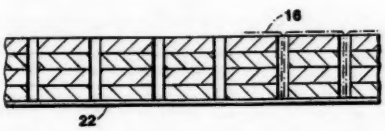
**PCT No. PCT/GB93/01252, § 371 Date Jun. 9, 1994, § 102(e) Date Jun. 9, 1994, PCT Pub. No. WO93/25379, PCT Pub. Date Dec. 23, 1993**

**PCT Filed Jun. 14, 1993, Ser. No. 182,188**

**Claims priority, application United Kingdom, Jun. 15, 1992, 9212697**

**Int. Cl.**[6] **B31D** *3/00;* **B44C** *1/22*

**U.S. Cl. 216—56** **34 Claims**



1. A method of manufacturing a multi-ply fabric reinforced perforate composite sheet in which the front face of the composite sheet is presented by one ply of the fabric and the rear face is presented by another ply of the fabric comprising the steps of forming a multi-ply fabric assembly which includes reinforcing filament structures and passage forming filament structures and in which the passage forming filament structures extend from the front face of the assembly to the rear face of the assembly, applying a matrix material to the assembly to form a multi-ply fabric reinforced composite sheet in which the front face of the composite sheet is presented by one ply of the fabric and the rear face is presented by another ply of the fabric and in which the passage forming filament structures extend from the front face of the sheet to the rear face of the sheet and removing the passage forming filament structure or a part or parts thereof thereby to produce a multiplicity of passages extending through the multi-ply fabric reinforced composite sheet from the front face of the sheet to the rear face of the sheet.

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**5,490,603**

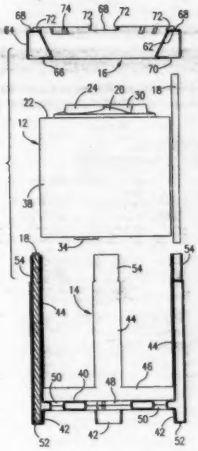
**FLUID TANK APPARATUS**

**Thomas R. Davis, Lincoln, Nebr., assignor to Snyder Industries, Inc., Lincoln, Nebr.**

**Filed Sep. 6, 1994, Ser. No. 300,970**

**Int. Cl.**[6] **B65D** *19/00*

**U.S. Cl. 220—4.12** **10 Claims**



1. A tank apparatus comprising:

a tank including top and bottom ends and a side wall extending between the ends, the side wall defining a tank diameter;

a hollow unitary base for supporting the tank, the base including a bottom wall on which the tank is supported, a plurality of hollow columns extending upward from the bottom wall, and plurality of hollow feet aligned vertically with the columns and depending from the bottom wall, the columns being spaced from one another to define a tank receiving area having a diameter slightly larger than the tank diameter; and

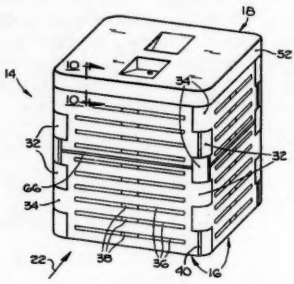
a top protector extending above the tank for protecting the tank from exposure to loads exerted on the apparatus from above, the top protector being supported on the columns for transmitting loads exerted on the top protector to the base without transmitting the load through the tank.

**5,490,604**

## COMPOSTER

**Norman Alexander, Algonquin, Ill., assignor to Shape Plastics Corp., Crystal Lake, Ill.**

**Filed Jul. 11, 1991, Ser. No. 728,380**
**Int. Cl.[6] B65D** *6/16*
**U.S. Cl. 220—4.34** **2 Claims**




**1**. A composter comprising,

a plurality of wall panels all of which are identical, and which are separate and detached from each other, and each having a bottom edge, and side edges,

the panels being adapted to be set upright on their bottom edges with their side edges in engagement respectively around a space to be enclosed,

a rod at each juncture of adjacent panels,

each wall panel including lugs with holes therethrough on each side edge, spaced apart vertically forming notches between adjacent lugs,

the lugs on each edge being so positioned relative to those on the opposite edge, that the lugs on each edge of each wall panel fit in the corresponding notches on the adjacent edge of the adjacent wall panel,

the holes being in the form of slots opening through side edges of the lugs, and displaced angularly relative to adjacent lugs on adjacent wall panels in each juncture of the panels,

the holes in all the lugs at each juncture of adjacent wall panels being capable of being aligned when the wall panels are in upright position for removably receiving the rods, all of the rods together securing all of the panels together,

each wall panel, and thereby any selected one, including a transverse median line on which the wall panel can be cut to form upper and lower separate parts, and

the median line being so located that when the selected wall panel is so cut, each of the upper and lower parts has at least two lugs on each side edge thereof.

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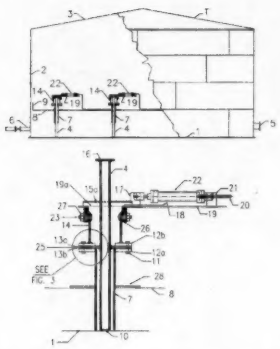
**5,490,605**

## FLOATING ROOF STORAGE TANK

**William T. Cutts, 14814 Cedar Isle Dr., Houston, Tex. 77084**

**Filed Jun. 20, 1994, Ser. No. 263,606**
**Int. Cl.[6] B65D** *87/18;88/40*
**U.S. Cl. 220—211** **11 Claims**




**1**. An improved storage tank of the type having a bottom, side walls and a floating roof in which the improvement comprises support means for selectively supporting said floating roof at first and second elevations above said bottom, said support means comprising:

a plurality of support legs engaging said bottom and extending upwardly therefrom;

a plurality of support sleeves attached to said floating roof and extending downwardly therefrom, said support sleeves surrounding said support legs and being vertically moveable relative thereto from first positions in which said support sleeves engage said bottom to support said floating roof at said first elevation and second positions in which said floating roof may be supported by said support legs at said second elevation; and

locking means attached to said support sleeves comprising a locking member horizontally moveable between an unlocked position, permitting unrestricted vertical movement of said support sleeves relative to said support legs, and a locked position engagable with said support legs, when said floating roof is at said second elevation, to prevent downward vertical movement of said support sleeves and to support said floating roof by said support legs in said second elevation.

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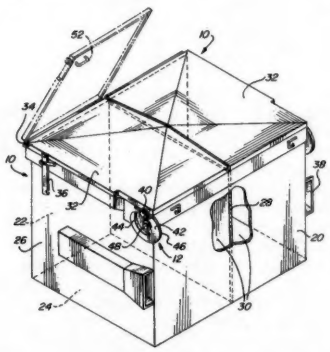
**5,490,606**

## REFUSE CONTAINER FOR SEGREGATING REFUSE AND TRUCK ATTACHMENT FOR USE IN CONNECTION THEREWITH

**Santo J. Lombardo, 141 Mountain Rd., Glastonbury, Conn. 06033**

**Filed Dec. 22, 1993, Ser. No. 171,902**
**Int. Cl.[6] B30B** *1/18*
**U.S. Cl. 220—324** **20 Claims**




**1**. A refuse container assembly for segregating and discharging refuse in two separate volumes, comprising:

(a) a refuse container having front, rear, bottom and side walls, a divider wall extending therewithin from the front to rear walls to divide the interior of said container into two compartments, and separate lids extending over said compartments, each of said lids being hingedly connected to said rear wall and having an engageable element thereon extending outwardly of the adjacent side wall;

(b) a locking member on the outer surface of each of said side walls and having a portion configured to engage with said engageable element on said lids;

(c) means movably supporting said locking members for movement along said outer surface of said side walls between a first position disengaged from said engageable element and a second position wherein said engageable element is engaged thereby to lock said lids in a closed position, both of said locking members being normally in one of said first position; and

(d) an actuating element for attachment to the fork assembly at the forward end of an associated refuse collection truck, said actuating element being cooperatively configured to move one of said locking members from said first position to said second position to lock said lid with the engageable element which is engaged, thereby allowing only the other of said lids to be opened to effect discharge of the contents of its compartment.

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**5,490,607**

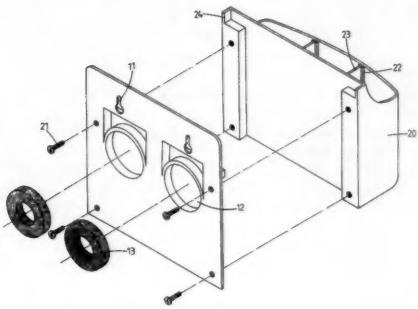
**KNIFE HOLDER**

**Wen-Hsiung Hsieh, and Hu M. Wu, both of 58, Ma Yuan West St., Taichung, Taiwan, Prov. of China**

**Filed Dec. 19, 1994, Ser. No. 360,011**

**Int. Cl.[6] A47F** *1/04*

**U.S. Cl. 220—483** **1 Claim**




1. A knife holder comprising:

a board including a front surface having a rib laterally formed thereon and a rear surface having at least one cavity formed therein,

a magnet member engaged in said cavity for attaching said knife holder to metal surface,

a case including a rear panel and flange means extended rearward from said rear panel for engaging with said front surface of said board, said rear panel and said rib forming a slot therebetween for receiving and for protecting knife blade, and means for securing said case to said board.

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**5,490,608**

**MULTIPLE DETERGENT CONTAINER**

**Quentin P. Hawkins, 2450 Weston Rd., Apt. 1005, Toronto, Ontario, Canada**

**Filed Jun. 24, 1994, Ser. No. 265,023**

**Int. Cl.[6] B65D** *90/04*

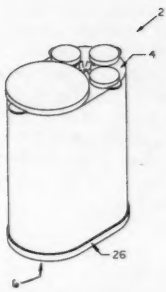
**U.S. Cl. 220—524** **15 Claims**

1. A portable container having:

(a) an upper surface;

(b) a lower surface;

(c) a first receptacle for containing a first substance said first receptacle having a first receptacle opening on said upper surface for receiving and discharging said first substance said first receptacle having a conical surface extending downwards from said first receptacle opening from said upper surface to a planar marker surface disposed between said upper surface and said lower planar surface;




(d) a plurality of second receptacles disposed between said upper and lower surfaces for containing a second substance each said second receptacles adapted to receive said second substance, each of said plurality of said second receptacles:

(i) extending between said upper and lower surface;

(ii) having an opening on said lower surface for receiving said powder; and

(iii) an opening on said upper surface for discharging said powder

wherein each of said second receptacles are of substantially equal volume when filled with powder to said planar marker surface.

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**5,490,609**

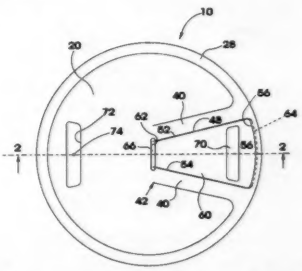
**BEVERAGE CUP LID HAVING PERIPHERAL LOCKING MEANS FOR DRINKING OPENING CLOSURE MEMBER**

**William F. Lane, Wilson, and Robert C. Williams, Raleigh, both of N.C., assignors to Bailey Marketing Group, Inc., Rocky Mount, N.C.**

**Filed Sep. 16, 1994, Ser. No. 307,303**

**Int. Cl.[6] A47G** *19/22;* **B65D** *51/18*

**U.S. Cl. 220—712** **20 Claims**




1. A lid for an open-mouthed drinking cup of the type having a rim portion about the mouth thereof, said lid comprising:

a cover portion for covering the open mouth of a drinking cup;

an annular cavity at the periphery of the cover portion in the form of an inverted U-shaped well having an upper closed end and a pair of depending spaced-apart inner and outer walls joined to the closed end, said spaced-apart walls serving to frictionally engage the rim portion of a drinking cup;

the inner wall of said U-shaped well being interrupted along a discrete arcuate portion of the lid periphery on the order of about 25° to 60° while leaving the outer wall and at least a portion of the upper closed end of the U-shaped well uninterrupted;

said cover portion including a section that is generally flat and surrounds along three sides a raised drinking section extending radially outwardly and upwardly from a central location of said cover portion to the periphery of the lid and joining the upper closed end of said well along the discrete arcuate portion of the lid periphery where the inner wall is interrupted;

a drinking opening formed in said raised drinking section; and

a closure member for the drinking opening, said closure member being hinged to the cover portion at a medial location thereon and having a sufficient radial dimension to permit the outward marginal edge portion of the closure member to reside under the upper closed end of said cavity well, whereby said marginal edge portion may be trapped between the rim portion of the drinking cup and the upper closed end of said well to lock the closure member in a closed position when the lid is in place on a drinking cup.

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**5,490,610**

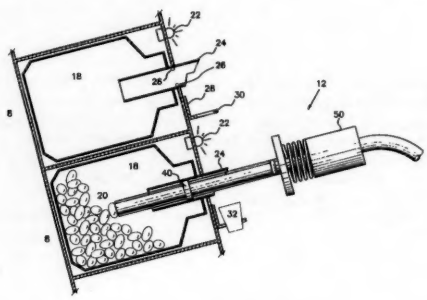
**SEMI-AUTOMATED MEDICATION DISPENSER**

**Walter G. Pearson, P.O. Box 4371, Pineville, La. 71361**

**Continuation of Ser. No. 206,877, Mar. 7, 1994, abandoned. This application Apr. 13, 1995, Ser. No. 421,456**

**Int. Cl.[6] G07F** *11/00*

**U.S. Cl. 221—2** **6 Claims**




1. An apparatus for dispensing appropriate medications in pill form to each of a plurality of patients, comprising:

(a) a plurality of compartments, wherein each of said compartments is adapted to hold one or more pills freely;

(b) means for inputting to the apparatus medication orders for each of the patients;

(c) means for compiling the input patient medication orders, and for outputting the total numbers of each pill anticipated to be consumed by the patients during a selected period of time, so that the total numbers of pills of each type of medication may be placed in said compartments, with no more than one type of medication per compartment;

(d) means for authorizing an operator of the apparatus to dispense medications from the apparatus, wherein the apparatus will not dispense medications until the operator has been authorized;

(e) means for correlating the time and a patient's identity to the dosages of each pill appropriate for the patient at that time in accordance with the medication orders, and for authorizing the operator of the apparatus to have access to the said compartments containing the pills appropriate for the patient at the time; and

(f) a tube connected to a partial vacuum, wherein said tube is adapted to enter each of the authorized said compartments and to retrieve a pill from each of the said compartments through the action of the partial vacuum.

**5,490,611**

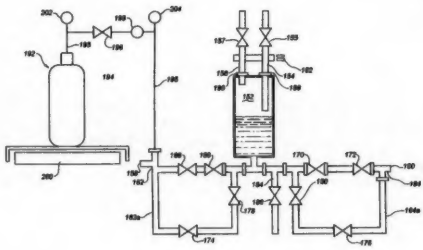
**PROCESS FOR PRECISE VOLUMETRIO DILUTING/ MIXING OF CHEMICALS**

**Eugene W. Bernosky, Hollister, Calif.; J. Tobin Geatz, Durham, N.C.; Edward T. Ferrie, Jr., Gilroy, and Glenn A. Roberson, Jr., Hollister, both of Calif., assignors to Applied Chemical Solutions, Inc., Hollister, Calif.**

**Division of Ser. No. 35,252, Mar. 22, 1993, Pat. No. 5,370,269, which is a continuation-in-part of Ser. No. 948,392, Sep. 21, 1992, Pat. No. 5,330,072, which is a continuation-in-part of Ser. No. 583,826, Sep. 17, 1990, Pat. No. 5,148,945. This application Dec. 5, 1994, Ser. No. 349,429**

**Int. Cl.[6] B67D** *5/08*

**U.S. Cl. 222—1** **13 Claims**



1. A process for precision mixing of chemicals from multiple bulk sources which comprises:

providing a metered vessel, such vessel comprising a container of predetermined volume;

providing a first intake conduit for the flow of chemical between a first bulk source and the metered vessel;

providing a first constricted fill tube in the container, the first fill tube extending to a first height;

providing a second intake conduit for the flow of chemical between a second bulk source and the metered vessel;

providing a second constricted fill tube in the container, the second fill tube extending to a second height which is higher than the first height;

providing at least first and second sensors associated with each fill tube, the first sensor detecting when the chemical level is approaching a desired volume and the second sensor positioned to detect the presence of chemical in the associated fill tube when chemical has reached the desired volume in the metered vessel;

providing a first valve on the first intake conduit responsive to the second sensor associated with the first fill tube, for ceasing fluid flow to the metered vessel through the first intake conduit;

providing a second valve on the second intake conduit responsive to the second sensor associated with the second fill tube, for ceasing fluid flow to the metered vessel through the second intake conduit;

providing a conduit from the metered vessel to at least one down-stream facility;

providing means to transfer chemical from the bulk sources to the metered vessel;

providing means to motivate chemical from the metered vessel to the down-stream facility; and

wherein precision mixing is accomplished by the following steps: motivating chemical from the first bulk source into the metered vessel until chemical reaches the second sensor associated with the first fill tube, at which point the first valve on the first intake conduit is regulated to cease chemical flow to the metered vessel; motivating chemical from the second bulk source into the metered vessel until chemical reaches the second sensor associated with the second fill tube, at which point the second valve on the second intake conduit is regulated to cease chemical flow into the metered vessel; mixing together the chemicals from the first bulk source and the

second bulk source in measured proportions provided from the metered vessel; and transferring mixed chemical to the down-stream facility.

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5,490,612

## FUEL DISTRIBUTOR ENABLING, FROM A SINGLE PRODUCT DISTRIBUTOR, TO DEVELOP IT INTO A MULTIPRODUCT DISTRIBUTOR

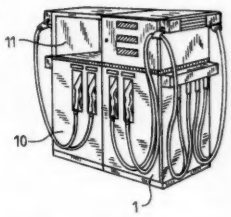
**Michel Coquerel, Villerville, and Philippe Coquerel, Moult, both of, France, assignors to Equipement Industriel Normand France, France**

**Filed May 11, 1994, Ser. No. 240,835**

**Claims priority, application European Pat. Off., Mar. 8, 1994, 94400499**

**Int. Cl.[6] B67D** *5/06*

**U.S. Cl. 222—25** **4 Claims**




1. A fuel dispenser, comprising:

a) a base having generally planar, front, rear and side walls bounding an upright axis, and housing a pumping station;

b) a nozzle connected to one end of a hose whose other end is operatively connected to the pumping station, said nozzle being mounted on, and accessible to a user at, one of the walls of the base;

c) a head having generally planar, front, rear and side surfaces bounding the upright axis and respectively co-planar with the front, rear and side walls of the base;

d) indicator means visible at one of the surfaces of the head for advising the user of commercial information relating to the fuel being dispensed; and

e) means for converting the dispenser from dispensing a single fuel to dispensing a plurality of fuels, by taming the base and the head about the upright axis such that both the indicator means on said one surface of the head and the nozzle on said one wall of the base face in the same direction toward the user, said converting means including a fuel distributor mounted on another of the walls of the base and having an inlet operatively connected to the pumping station, a first outlet connected to the hose, and a second outlet connected to an additional hose that, in turn, is connected to an additional nozzle mounted on a further wall of the base.

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5,490,613

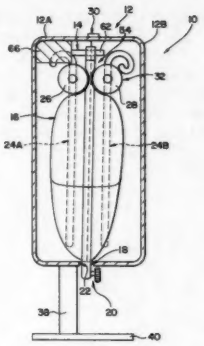
## VISCOUS FLUID DISPENSER

**R. Gregory Taylor, Pleasanton, and Larry F. Morice, San Ramon, both of Calif., assignors to The Clorox Company, Oakland, Calif.**

**Filed Jul. 7, 1994, Ser. No. 271,815**

**Int. Cl.[6] B65D** *35/28*

**U.S. Cl. 222—102** **8 Claims**




1. A dispenser for viscous fluids, comprising

a housing having an opening in a lower portion thereof,

a collapsible bag having an outlet,

dispenser means arranged in the bag outlet for dispensing fluid from the bag, hanger means in the form of multiple pegs arranged in an upper portion of the housing for suspending the bag generally vertically with the bag outlet extending through the housing opening,

roller means forming a nip and having a mass sufficient for collapsing the bag under the influence of gravity in order to positively extrude the fluid from the bag in response to operation of the dispenser means, and

guide means allowing the roller means to descend under the influence of gravity from an initial position adjacent the hanger means only when the fluid is expelled from the bag,

the collapsible bag forming an elongated flexible closure and having reinforced openings at its upper end for mating with the multiple pegs, the outlet being in a lower end of the bag, and dispenser means arranged in the bag outlet for dispensing fluid extruded from the bag by the roller means and otherwise forming an enclosed compartment for the fluid whereby fluid in the collapsible bag remains unexposed to the atmosphere until it exits from the bag outlet, the collapsible bag being laterally tapered adjacent the outlet at its lower end and having a thickness corresponding to the nip formed by the roller means to facilitate extrusion of substantially all fluid from the bag by the roller means.

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5,490,614

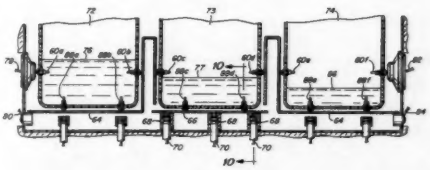
## BEVERAGE DISPENSER TRAY ASSEMBLY

**Gary F. Sardynski, Medford, Mass., assignor to Jet Spray Corp., Norwood, Mass.**

**Filed Nov. 10, 1993, Ser. No. 151,069**

**Int. Cl.[6] B67D** *5/56*

**U.S. Cl. 222—129.1** **20 Claims**




1. A beverage dispenser having a refrigerated compartment for holding more than two containers for holding syrup, each container having a plurality of electrodes, the dispenser comprising:

a first horizontal tray for supporting a first container;

a second horizontal tray for supporting a second container, wherein the first and second trays are electrically insulated from each other, the second container having a first electrode for contacting the first tray and a second electrode for contacting the second tray; and

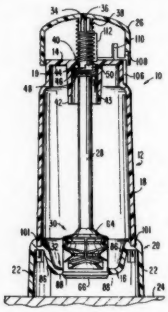
a lead for providing an electrical signal to one of the first and second electrodes, wherein a conductive path is formed between the first and second electrodes when the syrup is at least at a certain level.

**5,490,615**

## CONDIMENT DISPENSER WITH VARIABLE QUANTITY CONTROL, LOCKABLE HERMETIC SEALS AND REMOVABLE BASE

**E. Stanley Robbins, Killen; Frans M. Weterrings, Tuscumbia, and Rodney R. Robbins, Florence, all of Ala., assignors to Robbins Industries, Inc., Florence, Ala.**

**Filed Jan. 7, 1994, Ser. No. 178,889**
**Int. Cl.[6] G01F** *11/18*
**U.S. Cl. 222—153.13** **23 Claims**



**1**. A condiment dispenser, said dispenser comprising, in combination, a housing for holding the condiment to be dispensed, said housing having a side wall, a bottom wall and a top wall, one of said walls having an access opening, an outlet opening in one of said walls, a dispensing head mounted in said housing to move through said outlet opening, said dispensing head having a plurality of recesses spaced from one another, an actuator extending through said access opening and manually operable to move said head through said opening to selectively dispense the contents of said resesses, and a quantity control device comprising a plurality of stops selectable to limit the movement of said dispensing head through said outlet opening to a pre-selected one of a plurality of distances, each corresponding to a pre-selected quantity of said condiment to be dispensed.

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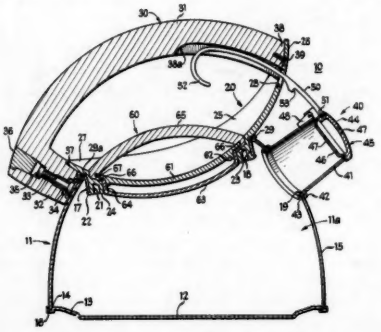
**5,490,616**

## TEAKETTLE

**Davin B. Stowell, New York, N.Y.; Mari H. Ando, Stamford, Conn., and Vanessa D. Sica, New York, N.Y., assignors to General Housewares Corp., Terre Haute, Ind.**

**Filed Sep. 13, 1994, Ser. No. 305,100**
**Int. Cl.[6] B65D** *83/00*
**U.S. Cl. 222—472** **20 Claims**



**7**. A kettle comprising: a hollow body defining a reservoir chamber, a spout projecting from said body and communicating with said chamber, a handle mounted on said body and extending thereabove and having a forward end disposed adjacent to said spout, and a guard extending upwardly from said body between said spout and the forward end of said handle and shaped and dimensioned for protecting a user's hand from steam emanating from said spout during pouring.

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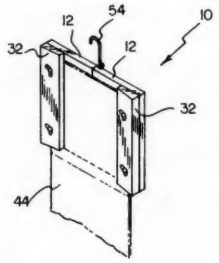
**5,490,617**

## ABDOMINAL BINDER STRETCHER

**Roland F. Jochim, and Dorothy M. Jochim, both of P.O. Box 114, 302 S. Oak St., Purcell, Mo. 64857**

**Filed Jul. 18, 1994, Ser. No. 276,788**
**Int. Cl.[6] D06C** *13/00;* **A47G** *25/00*
**U.S. Cl. 223—61** **2 Claims**



**2**. An abdominal binder stretcher for use in association with an abdominal binder formed in a planar rectangular configuration with edges, the apparatus comprising, in combination:

a pair of rigid planar members having coplanar upper edges and coplanar lower edges with parallel exterior and interior edges, the planar members having front faces and rear faces;

a pair of hinges coupling together the interior edges of the planar members for pivoting about the axis of the hinges;

a plurality of nails extending at right angles from the front surfaces of the planar members, the nails being in vertical lines adjacent to the exterior edges of the planar members;

a pair of elongated support bars having a height essentially equal to the height of the planar members with exterior edges alignable with the exterior edges of the planar members and interior edges extending to an intermediate extent of the planar members and adapted to cover the nails, a pair of apertures extending through each elongated support bar and its associated planar member;

four bolts extending through the apertures of the planar members and elongated support bars with wing nuts to hold the elongated support bars adjacent to the planar members to ensure the retention of the edges of an abdominal binder received on the nails; and

a latch on the rear face of one of the planar members with an associated eyelet on the other rear face to retain the planar members in a common plane with the latch is in the eyelet.

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**5,490,618**

## PAINT PAIL CARRIER

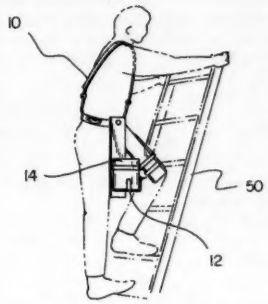
**Dennis A. Davidson, 81 Bailey Ave., Patchogue, N.Y. 11772**

**Filed Feb. 23, 1995, Ser. No. 393,354**
**Int. Cl.[6] A45F** *5/00*
**U.S. Cl. 224—148** **8 Claims**

**1**. A paint pail carrier adapted for attachment to a person for maintaining an open paint pail in a vertical orientation, said carrier comprising:

a waist strap having clasping means thereon for firm attachment to the waist of the person;

a shoulder strap having opposing ends attachable to the waist strap and adjustment clasping means for firmly fitting over a shoulder of the person;




a vertically oriented first elongate member having a lower section, an upper section and a middle section therebetween wherein said lower section has means thereon for supporting the paint pail and said upper section having means thereon for swivel attachment to a location on said waist belt; and

a second elongate member having means thereon for swivel attachment to said location on said waist belt and a leg strap having clasping means thereon for firm attachment to a leg of the person adjacent said location on said waist belt, said second elongate member having at least one slide strip oriented on an outer surface thereof adapted for sliding engagement with a surface of said vertically oriented first elongate member.

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**5,490,619**

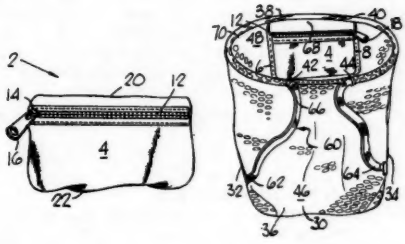
**DEVICE AND METHOD FOR TRANSPORTING ARTICLES**

**Florene E. Boyar, 13691 E. Evans, Aurora, Colo. 80014**

**Filed Mar. 22, 1994, Ser. No. 216,255**

**Int. Cl.[6] A45C** *3/00*

**U.S. Cl. 224—153** **19 Claims**




1. A device for providing a plurality of ways for transporting articles comprising:

a readily flexible purse being relatively small and having a first outside surface and a first inside surface and having only one closable opening formed therein;

said readily flexible purse being capable of being turned inside out so that said first outside surface becomes a second inside surface and said first inside surface becomes a second outside surface;

first mechanical means for opening or closing said only one closable opening;

a bag being relatively large and flexible being located within said purse before it is turned inside out;

securing means for securins said purse to said bag so that said bag is available for use for holding articles when said purse is turned inside out;

said bag, when available for use for holding articles, having an outer surface and an inner surface;

said purse being located to be superposed over one portion and opposite to another portion of said inner surface, when said bag is available for use for holding articles; and

second mechanical means for opening or closing said only one closable opening when said purse has been turned inside out; and

carrying means connected to said bag so that an individual can carry said bag in a plurality of different ways to transport articles from one location to another location.

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**5,490,620**

**CHILD-SUPPORTING SHOULDER HARNESS**

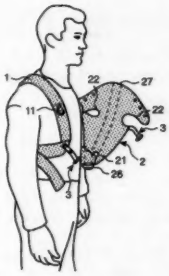
**Håkan Bergqvist, Beckombergavägen, Sweden, assignor to Baby Bjorn AB, Stocksund, Sweden**

**Continuation of Ser. No. 956,767, Sep. 18, 1992, abandoned. This application Jul. 5, 1994, Ser. No. 270,534**

**Claims priority, application Sweden, Jan. 18, 1991, 9100160**

**Int. Cl.[6] A47D** *13/02*

**U.S. Cl. 224—160** **13 Claims**




1. A child-supporting shoulder harness comprising two mutually joined looped straps (**1**) for extending around both shoulder regions of a wearer, and a child-supporting flap (**2**) having two sides each of which is releasably connected to one of the looped straps (**1**) both at the top and at the bottom of each of the two sides, such as to form a child-supporting pouch, wherein fastening connections (**3, 11**) between the looped straps (**1**) and an upper part of the child-supporting flap (**2**) at both sides thereof can be released completely so as to enable the flap to be lowered around a bottom connection (**3, 21**) of the flap with the straps (**1**), wherein connections (**3, 21**) between each looped strap (**1**) and a lower part of the flap (**2**) are releasable, whereby the flap can be released from the looped straps (**1**); and in that the looped straps (**1**) are mutually joined on a rear side of the harness and remain looped when putting on the harness and when the child supporting flap is released to an open position.

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**5,490,621**

**SKI-CARRIER MODULE WITH MODULE ATTACHMENT APPARATUS**

**Michael Dixon, Fremantle, Australia; James B. Hudson, Laguna Hills, and Jon Apogee, Mira Loma, both of Calif., assignors to Sport Carriers, Incorporated, Colton, Calif.**

**Filed Mar. 1, 1993, Ser. No. 25,313**

**Int. Cl.[6] B60R** *9/00*

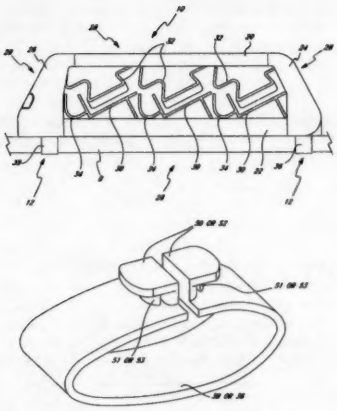
**U.S. Cl. 224—319** **6 Claims**

1. An interchangeable module attachment apparatus comprising a vehicle rack bar,

a first and a second wrap-around attachment anchor attached to said vehicle rack bar,

each wrap-around attachment anchor including

a flexible C-shaped band wrapped around said vehicle rack bar, each band having two open ends,



an anchor head being connected to each of the open ends of said C-shaped band via an anchor neck,

said anchor neck having an anchor neck protrusion, and

said anchor head being sized to extend beyond said anchor neck protrusion.

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**5,490,622**

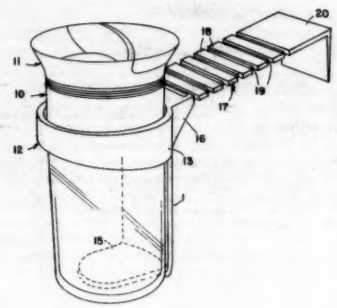
**COMMUTER MUG AND HOLDER ASSEMBLY**

**Pierre Tardif, Longueuil, Canada, assignor to Genin Trudeau, Quebec, Canada**

**Filed Oct. 11, 1994, Ser. No. 320,209**

**Int. Cl.**[6] **B60N** *3/10;* **B65D** *39/02*

**U.S. Cl. 224—556** **10 Claims**



1. A commuter mug and holder assembly connectable to a door of an automobile having a window retractable into a slot in a door panel having an inner section, the mug being adapted to supply an occupant or driver of the vehicle with a hot beverage; said assembly comprising:

A. a mug formed by a cylindrical container for the hot beverage;

B. a removable lid for the container, said lid being divided into a semi-circular open front section having an arcuate front wall and a semi-circular rear section having an arcuate rear wall and a base, a flexible shutter disc connected at an underside of the lid to seal the container, said disc being hinged to the base of the rear section and being deflectable to create an outlet for the beverage in the front section; and an actuator pivoted on the arcuate wall of the rear section which when depressed by a user of the mug, then acts to deflect the disc to create said outlet in the front section whereby the user may then drink the beverage from the outlet; and

C. a holder adapted to hold the mug and provided with a hook that is insertable in a space between the window and the inner section of the door panel to support the mug in an upright position adjacent the door.

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**5,490,623**

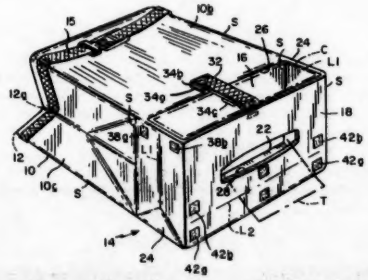
**UTILITY BAG**

**Michael P. McConnell, Durham, N.H., assignor to Talus Corporation, Portland, Me.**

**Filed Dec. 13, 1994, Ser. No. 354,967**

**Int. Cl.**[6] **B60R** *7/00;7/10;9/00;11/00*

**U.S. Cl. 224—275** **5 Claims**



1. A portable utility bag comprising

plurality of flexible walls defining a first receptacle having an opening thereinto;

plurality of flexible panels attached to each other and to at least some of said flexible walls to define a second receptacle adjacent to the first receptacle and having an opening therein into oriented perpendicular to the opening into the first receptacle, and

means fixed to the plurality of panels for suspending the bag so that the opening into the first receptacle faces upward, said plurality of panels including a front panel, a bottom panel, and a pair of opposite side panels connecting said front and bottom panels, said side and bottom panels being foldable at fold lines extending along the respective side and bottom panels so as to collapse said second receptacle; and further including fastening means for releasably fastening said second receptacle in its collapsed condition.

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**5,490,624**

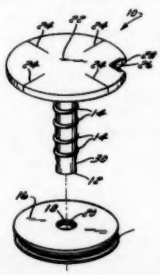
**TIPPET TAMER**

**Edward Q. Yavitz, 3828 Spring Creek Rd., Rockford, Ill. 61114**

**Filed Apr. 13, 1994, Ser. No. 227,269**

**Int. Cl.**[6] **B65H** *16/02*

**U.S. Cl. 225—34** **10 Claims**



1. A post for supporting a number of spools of thread, fishing line or wire, comprising a resilient post having a number of ribs

spaced at equal intervals along a length of the post, a number of spools each having an opening with a diameter corresponding to an outer diameter of the post, a flat disk mounted at one end of the post, said disk having a number of notches radially spaced around a periphery of the disk for frictionally securing ends of the thread on the spools to the disk, one of said notches having a blade for cutting the thread, line or wire, to a desired length.

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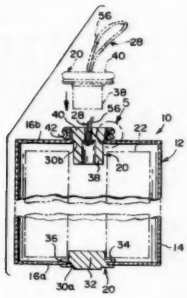
**5,490,625**

## PAPER TOWEL AND TOILET PAPER PORTABLE DISPENSER

**Patricia A. Myatt, 191 Willoughby St., Apt. 4-A, Brooklyn, N.Y. 11201**

**Filed Apr. 21, 1994, Ser. No. 230,720**
**Int. Cl.[6] B26F** *3/02*
**U.S. Cl. 225—47** **6 Claims**




**1**. An improved paper towel and toilet paper portable dispenser, comprising:

a) a hollow cylindrical housing having a housing first end and a housing second end and containing a housing longitudinally disposed slot extending from said housing first end to said housing second end so that a roll of the paper towel/toilet paper can be removably inserted into said hollow cylindrical housing and a free portion of the roll is extendable through said housing longitudinally disposed slot;

b) a housing first end wall disposed at said housing first end and containing a centrally disposed housing first end wall aperture with a housing first end wall aperture circumferencial edge, said centrally disposed housing first end wall aperture having a diameter less than that of said first end wall;

c) a housing second end wall disposed at said housing second end and containing a centrally disposed housing second end wall aperture with a housing second end wall aperture circumferencial edge, said centrally disposed housing second end wall aperture having a diameter less than that of said second end wall and being in alignment with said centrally disposed housing first end wall aperture, said cylindrical housing, said housing first end wall, and said housing second end wall defining a housing chamber;

d) a housing longitudinal flap covering said housing longitudinally disposed slot and extending from said first end wall to said second end wall so that the roll of paper towel/toilet paper contained in said housing chamber is protected;

e) a stub shaft having a stub shaft body with a stub shaft flange extending radially outwardly therefrom, said stub shaft flange having a stub shaft flange circumferencial edge containing a circumferencially disposed annular groove, said stub shaft being removably mounted in said centrally disposed housing first end wall aperture with said circumferencially disposed annular groove receiving said housing first end wall aperture circumferencial edge, said stub shaft body extending into said housing chamber and rotatively retaining one end of the roll of the paper towel/toilet paper;

f) a collar extending longitudinally outwardly from said housing second end wall aperture circumferencial edge and having a collar free end;

g) a collar flange extending radially outwardly from said collar free end and having a collar flange open lower edge;

h) an end cap being removably mounted in said collar and having an end cap lower end and an end cap upper end; and

i) an end cap flange extending radially outwardly from said end cap upper end and having an end cap flange open lower edge so that when said end cap is inserted into said collar said end cap flange open lower edge receives said collar flange in a releasable manner with said end cap lower end extending into said housing chamber and rotatively retaining another end of the roll of the paper towel/toilet paper.

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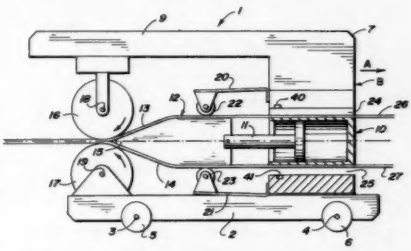
**5,490,626**

## DEVICE FOR WELDING FOIL EDGES

**Renald Kaminski, An der Friedensburg 2, 52511 Geilenkirchen, Germany**

**Filed Nov. 8, 1994, Ser. No. 337,476**
**Claims priority, application Germany, Nov. 9, 1993, 9317104 U**
**Int. Cl.[6] B23K** *20/04*
**U.S. Cl. 228—44.3** **5 Claims**




**1**. Device for the overlapping welding of foil edges, said device having heating surfaces for heating the foil edges, characterized in that heating surfaces (**43**, **44**, **45**, **46**) are provided with longitudinal ribs (**47**).

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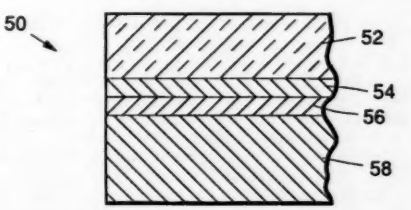
**5,490,627**

## DIRECT BONDING OF COPPER COMPOSITES TO CERAMICS

**Alvin L. Krum, Huntington Beach, and William T. Campbell, Costa Mesa, both of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.**

**Filed Jun. 30, 1994, Ser. No. 268,488**
**Int. Cl.[6] B23K** *31/00*
**U.S. Cl. 228—124.1** **10 Claims**




**1**. A process for direct bonding a ceramic to a copper composite, said process comprising the steps of:

heating a copper composite substrate to a first temperature at which copper diffuses to a region adjacent the surface of said substrate,

oxidizing said substrate after heating,

placing a ceramic member in contact with the resulting oxidized substrate in an inert atmosphere at a second temperature sufficient to produce a copper-copper oxide eutectic at the interface between said oxidized substrate and said ceramic member, said eutectic, upon cooling, forming a bond between said ceramic and said copper composite.

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**5,490,628**

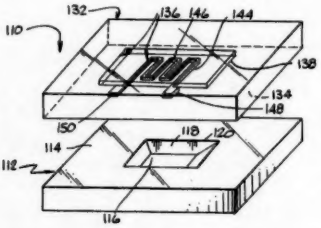
## MICROCHIP ASSEMBLY WITH ELECTRICAL ELEMENT IN SEALED CAVITY

**Christopher C. Beatty, Fort Collins, Colo., assignor to Hewlett-Packard Company, Palo Alto, Calif.**

**Continuation of Ser. No. 292,648, Aug. 18, 1994, abandoned, which is a division of Ser. No. 872,467, Apr. 23, 1992, Pat. No. 5,367,194, which is a continuation of Ser. No. 605,282, Oct. 29, 1990, Pat. No. 5,177,595. This application Feb. 21, 1995, Ser. No. 391,299**

**Int. Cl.[6] B23K** *31/02;35/14*

**U.S. Cl. 228—124.6** **6 Claims**




1. A method of producing a device having at least a portion of an electrical circuit element contained within a hermetically sealed enclosure comprising the steps of:

forming a cavity in a first substrate assembly wherein said cavity has a cavity opening at a first surface portion of the first substrate assembly;

forming both an electrical circuit element and a sealing ring from a common film applied to a first surface portion of a second substrate assembly with the sealing ring arranged in circumscribing relationship with at least a portion of the circuit element;

positioning the first surface portion of the first substrate assembly opposite the first surface portion of the second substrate assembly with the sealing ring located in circumscribing relationship with the cavity opening; and

sealingly bonding the sealing ring to the first surface portion of the first substrate assembly.

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**5,490,629**

## ROCKET ENGINE NOZZLE WITH AN ENGINE DIFFUSER

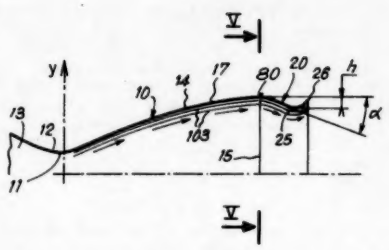
**Claude Bonniot, Vernon; Didier Vuillamy, Quincampoix; Pierre Desclos, Vernon; Etienne Tiret, La Chapelle Reanville, and André Beaurain, Chambly, all of, France, assignors to Societe Europeenne de Propulsion, Suresnes, France**

**Filed May 25, 1994, Ser. No. 248,968**

**Claims priority, application France, May 28, 1993, 93 06454**

**Int. Cl.[6] F02K** *9/97*

**U.S. Cl. 239—265.15** **10 Claims**




1. A rocket engine nozzle of the first stage of a launcher with an ejectable diffuser, comprising a convergent portion which receives the gases produced in a combustion chamber, a nozzle throat of small cross-section and a diverging part connected to the nozzle throat and terminating at its downstream portion in a gas jet outlet cross-section which defines a high cross-section ratio greater than about 50,

wherein the downstream portion of the diverging part is extended by an ejectable diffuser which, downstream from the zone where it is connected to the diverging part, presents a zone of smaller cross-section that acts during a first stage of flight in the presence of significant outside pressure to recompress the flow of hot gases and to prevent a flow separation from appearing along the wall of the diverging part.

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**5,490,630**

## HAND-HELD AEROSOL DISPENSER FOR THERAPEUTIC LIQUIDS

**Karl-Heinz Hecker, Aschau, Germany, assignor to Kendall Medizinische Erzeugnisse GmbH, Neustadt/Donau, Germany**

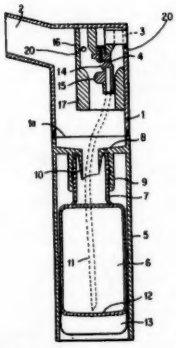
**PCT No. PCT/EP92/02471, § 371 Date Apr. 28, 1994, § 102(e) Date Apr. 28, 1994, PCT Pub. No. WO93/08856, PCT Pub. Date May 13, 1993**

**PCT Filed Oct. 29, 1992, Ser. No. 232,057**

**Claims priority, application Germany, Jan. 29, 1991, 9113446 U**

**Int. Cl.[6] A61M** *11/08;15/00*

**U.S. Cl. 239—309** **12 Claims**




1. A hand-held aerosol dispenser for a therapeutic liquid for inhalation therapy, comprising:

a housing including means for detachably connecting with a reservoir, said reservoir for containing said therapeutic liquid therein;

said housing further including a partition disposed therein;

said partition including a connecting piece carried on a lower part thereof, said connecting piece comprising said means for detachably connecting with a reservoir;

a breaker connection piece disposed within said connecting piece;

said breaker connection piece having an external dimension smaller than an internal dimension of said neck part of said reservoir;

means for receiving compressed air including an atomizing nozzle disposed within said housing;

a suction opening disposed proximate said atomizing nozzle, said suction opening communicating with said therapeutic liquid through a suction nozzle having a lower end terminating proximate a bottom of said reservoir when said reservoir is connected to said housing;

a cylindrical separating chamber, open at a bottom thereof, and which surrounds said atomizer nozzle;

said cylindrical separating chamber being spaced apart from an inner surface of said housing;

said cylindrical separating chamber and said housing include openings formed therethrough communicating with outside air; and

a mouthpiece for inhaling a mist produced within said housing.

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**5,490,631**

## HEAT-INSULATING PAPER CONTAINER AND METHOD FOR PRODUCING THE SAME

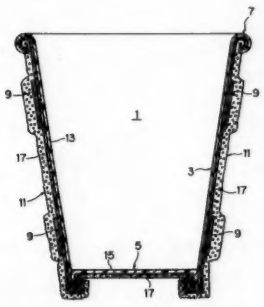
**Akira Iioka; Kenji Ishii, both of Chiba, and Yasushi Oguma, Misato, all of, Japan, assignors to Nihon Dixie Company Limited, Tokyo, Japan**

**Filed Dec. 19, 1994, Ser. No. 358,761**

**Claims priority, application Japan, Dec. 22, 1993, 5-346302; Jan. 25, 1994, 6-284125**

**Int. Cl.[6] B65D** *3/22*

**U.S. Cl. 229—403** **15 Claims**




1. A heat-insulating paper container comprising a body member and a bottom panel member, an area of the outer surface of said body member being provided with printing of an organic solvent based ink, wherein a thick foamed heat-insulating layer that is made of a thermoplastic synthetic resin film is formed in the printed area of said outer surface whereas a less thick foamed heat-insulating layer that is made of the same thermoplastic synthetic resin film is formed in the non-printed area of said outer surface.

4. A process for producing a heat-insulating paper container comprising the steps of providing a body member and a bottom panel member, applying printing to an area of the outer surface of said body member with an organic solvent based ink, covering all outer surfaces of said body member including the printed area with a thermoplastic synthetic resin film, fabricating the thus treated body member and the bottom panel member into a container, heating the container so that said thermoplastic synthetic resin film is foamed, thereby forming a thick foamed heat-insulating layer in the area of the outer surface of said body member which has been printed with the organic solvent based ink and forming a less thick foamed heat-insulating layer in the non-printed area of the outer surface of said body member.

**5,490,632**

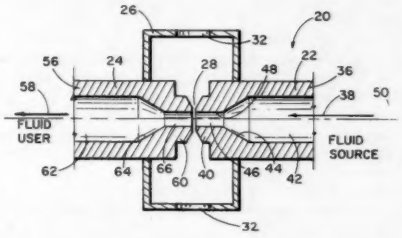
## VENTING DEVICE AND METHOD

**Henry T. Haynes, 105 E. G St., Jenks, Okla. 74037**

**Continuation-in-part of Ser. No. 176,801, Dec. 30, 1993, Pat. No. 5,386,941, which is a continuation-in-part of Ser. No. 46,646, Apr. 13, 1993, Pat. No. 5,284,298. This application Nov. 4, 1994, Ser. No. 334,156**

**Int. Cl.[6] B05B** *9/00*

**U.S. Cl. 239—119** **29 Claims**




1. A device for venting a conduit and allowing fluid flow through the conduit, comprising:

(a) an upstream conduit having a first end connectable to a fluid source, a second end, and a fluid passageway extending through the first and second ends, the upstream conduit comprising:

an acceleration nozzle disposed in the fluid passageway for accelerating the velocity of the fluid flow; and

an upstream throat, extending between the acceleration nozzle and the second end of the upstream conduit, for maintaining the accelerated velocity of the fluid flow from the acceleration nozzle;

(b) a downstream conduit having a first end connectable to a fluid user, a second end, and a fluid passageway extending through the first and second ends, the downstream conduit comprising:

a deceleration nozzle disposed in the fluid passageway for decelerating the velocity of the fluid flow; and

a downstream throat, extending between the deceleration nozzle and the second end of the downstream conduit, for receiving the accelerated fluid from the upstream throat and maintaining the accelerated fluid at substantially the same velocity as the fluid exiting the upstream throat; and

(c) support means for holding the upstream and downstream conduit with the upstream and downstream throats aligned and for maintaining a gap between the upstream and downstream conduit and between the upstream and downstream throats.

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**5,490,633**

## APPARATUS FOR LIGAMENT MADE ELECTROSTATIC SPRAYING

**Andrew Jeffries; Michael L. Green, and Timothy J. Noakes, all of Clywd, Wales, assignors to Imperial Chemical Industries PLC, London, England**

**Continuation of Ser. No. 843,078, Mar. 2, 1992, Pat. No. 5,292,067. This application Sep. 9, 1993, Ser. No. 118,247**

**Claims priority, application United Kingdom, Mar. 1, 1991, 9104373; Mar. 1, 1991, 9104374; European Pat. Off., Jan. 15, 1991, 91309472**

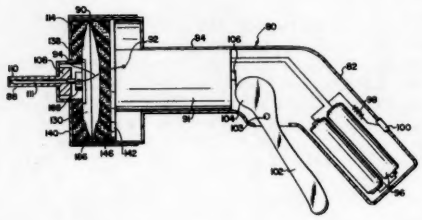
**The portion of the term of this patent subsequent to Mar. 8, 2011, has been disclaimed.**

**Int. Cl.[6] B05B** *5/00*

**U.S. Cl. 239—691** **4 Claims**

1. A ligament mode electrostatic spraying device for spraying liquid, the device comprising:

a nozzle of pointed configuration defining a tip portion, the tip portion having an orifice;



means for supplying liquid having a resistivity less than about $1\times10^7$ Ohm-cm to the nozzle so as to be discharged through the orifice;

means for applying a high electrical potential to the liquid so that liquid supplied to the nozzle is projected from the orifice under the influence of electrostatic forces created by the potential applying means; and

potential gradient attenuating means encircling the orifice for establishing a potential having the same polarity as that applied to the liquid,

whereby the potential gradient in the immediate vicinity of the nozzle tip is attenuated and the liquid discharging from the orifice undergoes necking under the influence of the attenuated potential gradient to form a ligament having a cross-sectional diameter which is substantially smaller than the dimension of the orifice.

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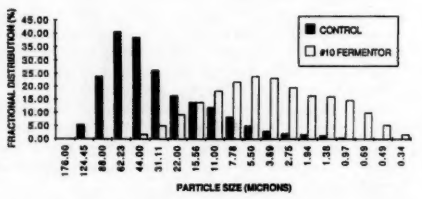
**5,490,634**

**BIOLOGICAL METHOD FOR COAL COMMINUTION**

**Mahendra K. Jain; Ramani Narayan, both of Okemos, Mich., and Ohantaek Han, Germantown, Wis., assignors to Michigan Biotechnology Institute, Lansing, Mich.**

**Filed Feb. 10, 1993, Ser. No. 16,119**
**Int. Cl.[6] B02C** *19/00*
**U.S. Cl. 241—1** **3 Claims**




1. In a method of reducing coal pieces to ultrafine particles suitable for use in coal water slurries, the improvement which comprises inoculating coal pieces having a mesh size of about 20 to about 100 with an anaerobic microorganism, which produces a decarboxylating enzyme, and incubating said pieces and microorganism under anaerobic conditions at a temperature of about 20° C. to about 40° C. until the coal pieces have been reduced to ultrafine particles.

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**5,490,635**

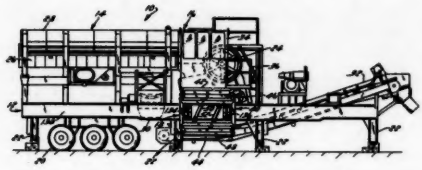
**CONTROL CAB SUPPORT MECHANISM**

**William R. Gray, New Berlin, Wis., assignor to Astec Industries, Inc., Chattanooga, Tenn.**

**Filed Jun. 2, 1994, Ser. No. 252,937**
**Int. Cl.[6] B02C** *9/04*
**U.S. Cl. 241—101.76** **21 Claims**

1. An apparatus comprising:

(A) a mineral processing machine having a portable chassis; and



(B) a control cab assembly for housing an operator for said mineral processing machine, said control cab assembly including

(1) a control cab; and

(2) a control cab support mechanism on which said control cab is mounted, said control cab support mechanism being actuatable to move said control cab vertically and linearly from a first position in which said control cab is supported only on said chassis to a second position in which said control cab is lifted from said chassis and supported only on the ground.

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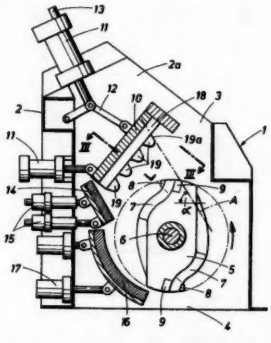
**5,490,636**

**ROTARY JAW CRUSHER**

**Hermann Schrödl, Vornwald 7, A-4713 Gallspach, Austria**

**Continuation of Ser. No. 113,527, Aug. 27, 1993, abandoned, which is a continuation of Ser. No. 822,442, Jan. 17, 1992, abandoned. This application Sep. 30, 1994, Ser. No. 316,561**
**Claims priority, application Austria, Jan. 21, 1991, 121/91**
**Int. Cl.[6] B02C** *13/00*
**U.S. Cl. 241—189.1** **2 Claims**



1. A rotary jaw crusher comprising the combination of

(a) a housing having a top charging opening,

(b) a rotor mounted in the housing below the charging opening for rotation in a predetermined sense about an axis of rotation, the rotor carrying

(1) at least one group of radially outwardly facing revolving jaws, the revolving jaws of each group being aligned in a direction extending parallel to the axis of rotation and each revolving jaw describing a predetermined flight circle upon rotation, the flight circles having an apex and a descending portion, and

(c) a stationary jaw fixed to the housing and extending therein above the descending portion of the flight circles, the stationary jaw rising towards the charging opening opposite to the predetermined sense of rotation and at an acute angle of inclination from the horizontal, the stationary jaw carrying

(1) crushing bars protruding toward the flight circles, each crushing bar having a longitudinal axis extending substantially over the length of the stationary jaw in a direction that is parallel to a line extending normal to the axis of rotation and a sharp edge facing the flight circles, the sharp

edges of the crushing bars extending in a direction that is parallel to a line extending normal to the axis of rotation, and

(2) chisel-like crushing teeth having a longitudinal axis extending perpendicularly to the longitudinal axes of the crushing bars, at least some of the crushing teeth being mounted on the crushing bars.

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**5,490,637**

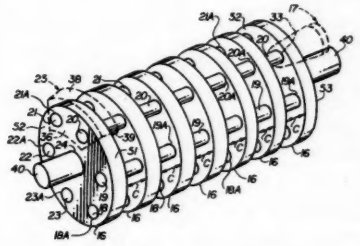
**METAL SHREDDING MACHINE**

**Kyriakos Golesis, 6125 E. Indian School Rd. #280, Scottsdale, Ariz. 85251**

**Filed Mar. 18, 1994, Ser. No. 210,621**

**Int. Cl.[6] B02C** *13/04;13/28*

**U.S. Cl. 241—194** **2 Claims**



1. In combination with apparatus for shredding metal including

a frame,

a rotating shaft mounted in said frame,

a plurality of generally cylindrical spaced apart plates mounted on and extending outwardly from the rotating shaft, each of the plates having an outer peripheral edge and a pair of opposing spaced apart side surfaces,

first spacer means for maintaining each adjacent pair of the plates a selected distance apart,

a plurality of aligned apertures formed through the plates and spaced apart from the rotating shaft,

an elongate rod fixed in the apertures, extending between the plates, and generally parallel to the rotating shaft,

a hammer mounted on the shaft intermediate an adjacent pair of the plates and extending outwardly from the plates away from the rotating shaft to contact and shred metal,

the improvements comprising

(a) second spacer means for altering the space between each adjacent pair of the plates to be greater than the selected distance; and,

(b) a plurality of U-shaped sleeves protecting portions of the peripheral edge and side surfaces of each of said adjacent pair of plates, each of said sleeves including

(i) an arcuate back adjacent a portion of the peripheral edge of one of said adjacent pair of plates, said back having a pair of ends each spaced apart from one of the ends of the arcuate back of another adjacent sleeve on the peripheral edge of said one of said adjacent pair of plates,

(ii) a pair of spaced apart arms connected to said back and extending outwardly from said back, each of said arms

spaced away from said rotating shaft and extending over a portion of one of said pair of side surfaces of said one of said adjacent pair of plates,

having side edges which each extend away from the outer peripheral edge of said one of said adjacent pair of plates, which each extend over said one of said pair of side surfaces of said one of said plates, and which are each spaced apart from a side edge of another adjacent sleeve on said one of said adjacent pair of plates, and

extending outwardly away from said one of said pair of side surfaces of said one of said adjacent pair of plates and toward the other of said adjacent pair of plates,

(iii) an aperture formed through said arms, said rod passing through said aperture to retain said sleeve in position on said one of said adjacent pair of plates to protect said portions of the peripheral edge and side surface of said one of said adjacent pair of said plates;

said hammer being positioned intermediate one of said sleeves on one of said adjacent pair of plates and one of said sleeves on the other of said adjacent pair of plates, and being spaced apart from each of said adjacent pair of plates,

said sleeves, said adjacent pair of plates, said hammer, and said rotatable shaft defining a first open area for receiving and permitting the passage of shredded metal, said open area extending between

said pair of adjacent plates,

said sleeves and said rotatable shaft, and

said hammer and said rotatable shaft,

said sleeves and said pair of adjacent plates defining second open areas each extending between adjacent pair of said sleeves on each of said pair of adjacent plates, said second open areas each extending between said side edges of adjacent pairs of said sleeves on each of said pair of adjacent plates.

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**5,490,638**

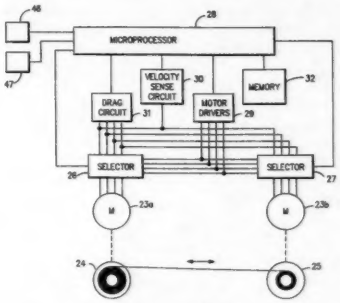
**RIBBON TENSION CONTROL WITH DYNAMIC BRAKING AND VARIABLE CURRENT SINK**

**James F. Driftmyer; Robert F. Jessen, Endwell, and George Melnyk, Endicott, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed Feb. 27, 1992, Ser. No. 843,875**

**Int. Cl.[6] B65H** *77/00*

**U.S. Cl. 242—421** **17 Claims**




1. A ribbon drive system including:

a pair of ribbon spools and a pair of motors individually operable to drive said spools,

each said motor being alternately operable to drive their respective ribbon spools whereby one motor is a drive motor when the other motor is a driven motor feeding ribbon connected between the spools,

said driven motor generating alternating back emf signals in windings of said driven motor in response to motion of said ribbon by said drive motor, and

dynamic electrical braking means for producing braking torque by said driven motor for applying tension to said ribbon, comprising:

bridge circuit rectifying means connected to said windings of said driven motor for rectifying said back emf signals,

current sink circuit means communicating with the rectifying circuit means for receiving the rectified output of said bridge rectifying circuit means and for maintaining a constant current from windings of the motors at a selected level, and

control means for selectively setting the level of current drawn by said current sink from said rectifying means in said current

sink circuit means for controlling the level of braking torque produced by said driven motor.

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**5,490,639**

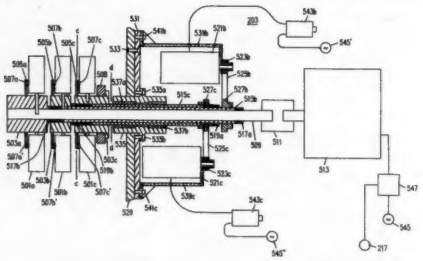
**MULTI-RAIL TENSION EQUALIZER**

**Christos F. Droutsas, Newark, Calif., assignor to National Semiconductor Corporation, Santa Clara, Calif.**

**Filed Dec. 22, 1993, Ser. No. 172,092**

**Int. Cl.[6] B65H** *35/02*

**U.S. Cl. 242—525.1** **20 Claims**



**1**. An apparatus for independently controlling the tension in each reel in a reel-to-reel material transfer system having multiple takeup reels, comprising:

a first drive shaft having a first end and a second end;

a first cylindrical drive shaft having an interior bore, a first end and a second end, wherein said first drive shaft is located inside said interior bore and wherein both said first end of said first drive shaft protrudes from said interior bore beyond said first end of said first cylindrical drive shaft and said second end of said drive shaft protrudes from said interior bore beyond said second end of said cylindrical drive shaft;

a first reel hub for mounting a first take-up reel and connected to a first end of said first drive shaft;

a second reel hub for mounting a second take-up reel and connected to a first end of said first cylindrical drive shaft;

a first motor connected to said second end of said first drive shaft; and

a first torque motor connected to said second end of said first cylindrical drive shaft.

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**5,490,640**

**TORQUE-ACTUATED EXPANSIBLE SHAFT ASSEMBLY FOR ROLL CORE**

**William R. Miller, Portland, Oreg.; Timothy J. Becker, Vancouver, Wash., and John E. Olson, Portland, Oreg., assignors to Tidland Corporation, Camas, Wash.**

**Filed Aug. 10, 1994, Ser. No. 288,946**

**Int. Cl.[6] B65H** *75/24*

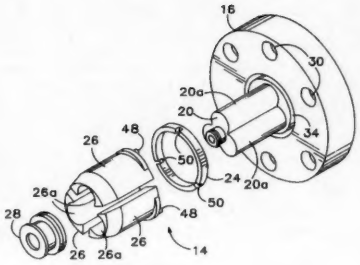
**U.S. Cl. 242—571.6** **16 Claims**

**1**. An expansible shaft assembly having a periphery for insertion into a roll core to exert torque on said core, said shaft assembly comprising:

(a) a shaft having an axis of rotation;

(b) a plurality of core-engagement shoes pivotally connected to said shaft so as to pivot about respective pivot axes extending parallel to said axis of rotation and spaced therefrom, said plurality of core-engagement shoes having outwardly-facing core-engaging surfaces pivotable about respective ones of said pivot axes; and

(c) some of said core-engaging surfaces being pivotable about their respective pivot axes outwardly from said periphery in response to torque applied to said shaft assembly in one axial direction while others of said core-engaging surfaces are pivotable about their respective axes outwardly from said periphery in response to torque applied to said shaft assembly in the opposite axial direction.



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**5,490,641**

**VEGETATION CUTTERS**

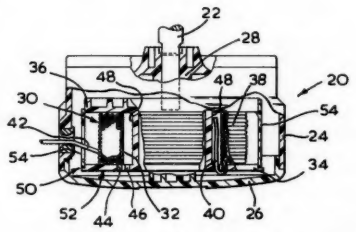
**John Worthing, Birtley, United Kingdom, assignor to Black & Decker Inc., Newark, Del.**

**Filed Jul. 27, 1994, Ser. No. 281,383**

**Claims priority, application United Kingdom, Jul. 28, 1993, 9315594**

**Int. Cl.[6] B65H** *18/00;75/02*

**U.S. Cl. 242—587** **10 Claims**



**1**. A spool for a rotary cutter comprising:

a core portion;

first and second flange portions spaced apart and connected to said core portion;

first and second apertures formed in said first flange portion;

said first aperture being in radial communication with the outside of said first flange;

an axial groove formed in and along the axis of said core portion;

said axial groove being in communication with said second aperture;

a flexible line having first and second ends and disposed about said core portion; and

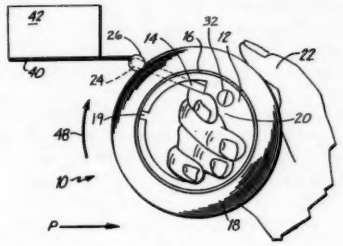
wherein said second end is used for cutting and said first end is secured to the spool by threading through said two apertures, and said first end is held in said axial groove in a position substantially parallel to the axis of said core portion.

5,490,642

## MANUAL TAPE DISPENSING APPARATUS

Mark E. Schwartz, Mahtomedi, and Raymond D. Zachrison, Lindstrom, both of Minn., assignors to Minnesota Mining and Manufacturing Company, Saint Paul, Minn.

Continuation of Ser. No. 44,950, Apr. 9, 1993, abandoned.
This application Jan. 26, 1995, Ser. No. 378,770
Int. Cl.[6] B32B *31/00*
U.S. Cl. 242—588 11 Claims




1. A portable manual tape stretching and dispensing apparatus for use with a roll of stretchable adhesive tape, the apparatus comprising:

a hub having a surface with dimensions such that the surface can be slidably received within an interior of the roll of tape to securely hold the roll of tape;

a handle means for manually grasping and manipulating the dispensing apparatus; and

a stretching surface relative to which the tape moves and over which the tape slides during dispensing and which is operatively connected to the hub, said stretching surface for providing a frictional force against the relative sliding movement of the tape over the stretching surface during dispensing so that the operator may selectively orient the dispensing apparatus in a stretching position and an unstretching position by changing the amount of sliding contact between the stretching surface and the tape, wherein in the stretching position, the sliding contact and frictional force are greater than the sliding contact and frictional force when in the unstretching position as caused by the change in orientation.

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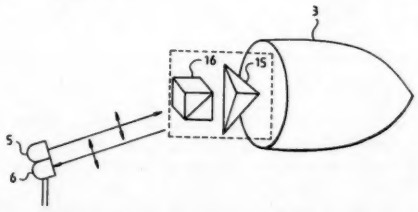
5,490,643

## OPTICAL DEVICE FOR THE UNAMBIGUOUS MEASUREMENT OF THE ROLL ANGLE OF A PROJECTILE

Patrice Jano, Seine Port, and Sylvie Rat, Paris, both of, France, assignors to Thomson-CSF, Paris, France

Filed Jun. 8, 1994, Ser. No. 255,994
Claims priority, application France, Jun. 8, 1993, 93 06833
Int. Cl.[6] F41G *7/00*
U.S. Cl. 244—3.11 5 Claims




1. An optical device for the measurement, without ambiguity, of the roll angle of a projectile launched by launching means located in a firing station, said device comprising, in the rear of the projectile, a retroreflector fitted out with a polarizer and, in the firing station, a light source that is offset laterally with respect to the firing axis of the projectile and whose beam illuminates the rear of the projectile, and a light flux analyzer operating on the light flux reflected by the rear of the projectile, wherein said polarizer is a polarizer with refraction index discontinuity positioned on the rear of the projectile, before the retroreflector, with an angle of inclination between the direction normal to its plane of index variation and the longitudinal axis of the projectile chosen to be greater than the Brewster angle in a range of monotonic variation of a transmission coefficient of the polarizer, the lateral offset of the light source with respect to firing axis of the projectile causing the angle of incidence of the light beam on the polarizer to vary around the value of the angle of inclination of the polarizer as a function of the roll angle of the projectile adding to the change in direction of polarization of the light beam returned by the projectile depending on the roll angle plus or minus $\pi$, a modulation of intensity depending on the roll angle plus or minus $2\pi$, wherein the light source and the light flux analyzer are set so as to give a signal of measurement of the direction of polarization whose maximum values, corresponding to two values separated from the roll angle by $\pi$, coincide with the maximum and the minimum of the modulation of intensity, and wherein the light flux analyzer comprises means to distinguish the two possible maximum values of its measurement signal by their different relative levels.

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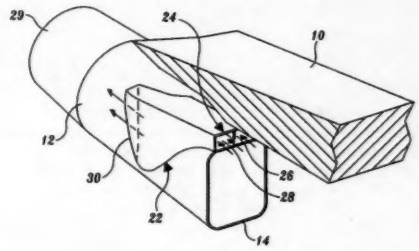
5,490,644

## DUCTED BOUNDARY LAYER DIVERTER

Joseph L. Koncsek, Seattle, and Steven L. McMahon, Lake Stevens, both of Wash., assignors to The Boeing Company, Seattle, Wash.

Filed Dec. 20, 1993, Ser. No. 170,129
Int. Cl.[6] B64D *29/04*; B64C *21/02*
U.S. Cl. 244—53 B 20 Claims




1. Boundary layer control apparatus for use with a propulsion nacelle positioned such that the air inlet of the propulsion nacelle is located adjacent an aircraft surface that establishes a boundary layer when the aircraft is propelled through an atmosphere, causing air to pass over said aircraft surface, said boundary layer control apparatus comprising, a duct means having an entrance positioned between said aircraft surface that establishes the boundary layer and said inlet of said propulsion nacelle for capturing the boundary layer air passing over said aircraft surface and diverting the boundary layer air away from the inlet.

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5,490,645

## FULLY INTEGRATED ENVIRONMENTAL AND SECONDARY POWER SYSTEM

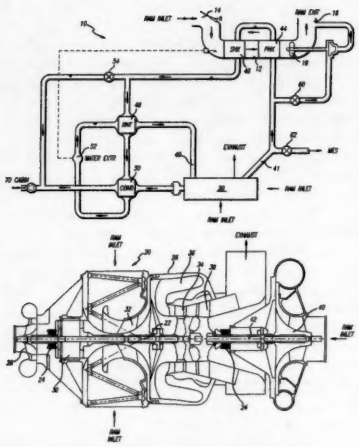
Geoffrey D. Woodhouse, Prescott, Ariz., assignor to Allied-Signal Inc., Morris Township, Morris County, N.J.

Filed Dec. 9, 1993, Ser. No. 164,491
Int. Cl.[6] B64D *13/06*
U.S. Cl. 244—118.5 3 Claims

1. An aircraft subsystem comprising:

a first and second shaft journalled for rotation to a housing;

a first compressor mounted to said first shaft;



a first turbine mounted to said first shaft;

a combustor disposed between said first compressor and said first turbine and in fluid communication therewith;

a starter/generator mounted to said first shaft for providing electricity to said aircraft;

a second compressor mounted to said second shaft and providing a flow of pressurized air;

a second turbine mounted to said second shaft and in fluid communication with said first turbine; and

a third turbine mounted to said first shaft and in fluid communication with said second compressor for cooling said flow of pressurized air and providing said cooled air to said aircraft.

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**5,490,646**

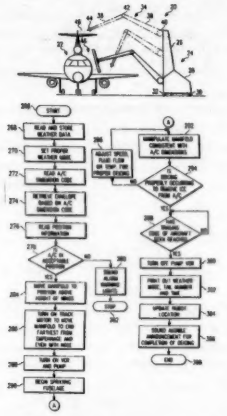
## AIRCRAFT MAINTENANCE ROBOT

**E. Craig Shaw, and Marlee Payne-Shaw, both of Carrollton, Tex., assignors to Conceptual Solutions, Inc., Dallas, Tex.**

**Division of Ser. No. 722,968, Jun. 28, 1991, Pat. No. 5,318,254. This application Jun. 28, 1993, Ser. No. 84,857**

**Int. Cl.[6] B64D** *15/00;* **B25J** *5/00*

**U.S. Cl. 244—134 C** **13 Claims**



1. An aircraft maintenance robot for maintaining aircraft surfaces, comprising:

a processing means for generating control signals;

a maintenance tool operable to support a plurality of nozzles operable to spray a plurality of maintenance substances on the aircraft surfaces and to perform video inspections of the aircraft surfaces;

means for delivering the substances to said maintenance tool responsive to the control signals for spraying the substances on aircraft surfaces;

means for sensing weather and adjusting the control signals to account changing conditions;

a plurality of arms coupled with one another and having a first and second free end with said first free end coupled to said wrist for positioning said wrist responsive to said control signals;

wherein said plurality of arms is further operable to position said video inspection apparatus responsive to the control signals so that the aircraft surfaces are video inspected; and

wherein the control signals generated by said processing means controls spraying substances on and inspecting aircraft surfaces without substantial intervention of a human operator.

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**5,490,647**

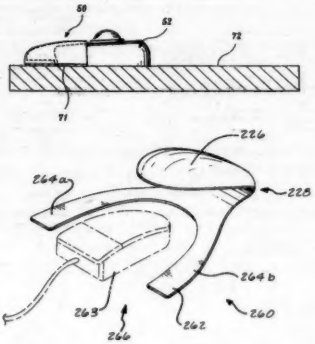
## PALM REST FOR USE WITH COMPUTER DATA ENTRY DEVICES

**Gregory H. Rice, 4351 Forest Ave. SE., Mercer Island, Wash. 98040**

**Continuation-in-part of Ser. No. 104,365, Aug. 9, 1993, Pat. No. 5,433,407. This application Oct. 22, 1993, Ser. No. 141,329 The portion of the term of this patent subsequent to Jul. 18, 2012, has been disclaimed.**

**Int. Cl.[6] B43L** *15/00*

**U.S. Cl. 248—118.1** **18 Claims**



1. An apparatus for minimizing posture- and stress-related disorders associated with the use of computer data entry devices, comprising:

a base that includes an upper and a lower surface, the lower surface of the base being of sufficiently low friction to allow the apparatus to be moved relative to the data entry device as data is being entered;

a palm support section for supporting a user's palm, the palm support section extending over a portion of the upper surface of the base to allow at least a part of the data entry device to be positioned between the palm support section and the upper surface of the base; and

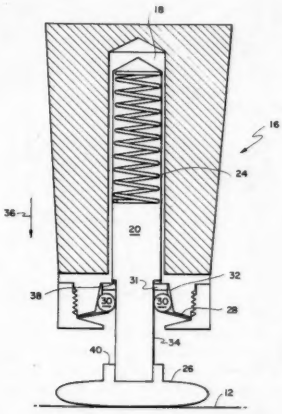
means for coupling the palm support section to the base.

**5,490,648**

## MECHANICAL STABILIZER

**Christopher P. Cullen, 400 Colonial Ave. #58, Ipswich, Mass. 01938**

**Filed Jun. 7, 1993, Ser. No. 73,135**
**Int. Cl.[6] F16M** *11/24*
**U.S. Cl. 248—188.3** **24 Claims**




**1**. A device for stabilizing an article, comprising:

a unit comprising first and second members adapted for relative movement such that said first member is selectively moveable along an axis for controllably extending and retracting said first member with respect to said second member within first and second regimes, said first regime allowing free extension of said first member relative to said second member while locking said first member against retraction and said second regime allowing said first member to be reversibly extended and retracted,

a coupling mechanism for enabling said regimes, the coupling mechanism comprising:

a bistable element capable of at least two configurations in which the element is stable at rest and is not biased or otherwise tending to another configuration and an engaging member disposed about the axis of motion of said first member and cooperatively constructed such that the bistable element in one configuration enables the first regime by positioning the engaging member to prevent retraction of first member but enable free extension of the first member, and

in another configuration, said bistable element enables said second regime by positioning said engaging member such that said first member is freely retractable and extendable, and

a regime control for switching between said first and said second regimes by changing the configuration of said bistable member.

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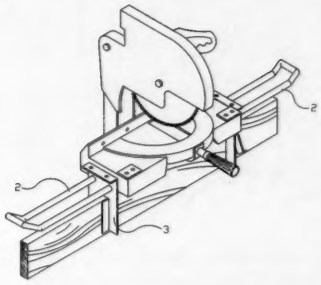
**5,490,649**

## DEVISE FOR MOUNTING, SECURING AND SUPPORTING PORTABLE POWER TOOLS HAVING BED EXTENSION ASSEMBLIES

**Louis N. Kusalich, P.O. Box 541, Soquel, Calif. 95073**

**Filed May 19, 1994, Ser. No. 246,109**
**Int. Cl.[6] A47B** *96/06*
**U.S. Cl. 248—214** **4 Claims**

**1**. A support member in combination with a bed extension member for supporting a portable power tool, said bed extension member having a pair of legs adapted to be disposed on each side of said tool, said support member having a pair of openings through which said legs of said extension member is inserted to position said support member relative to said tool, a slot in said support member for mounting said support member on a support surface, and locking means in said support member adjacent said slot for engaging said support surface to firmly mount said support member, bed extension member and said tool to said support surface.

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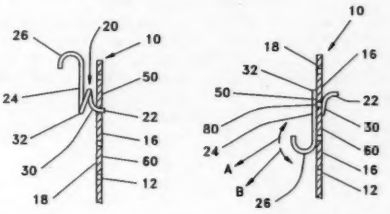
**5,490,650**

## COMBINED HANGING APPARATUS AND PEGBOARD AND METHOD FOR INSTALLING A HANGING APPARATUS ON A PEGBOARD

**Frank Pendergrass, 106 N. Chariton, Kingman, Kans. 67068**

**Filed Sep. 14, 1994, Ser. No. 305,827**
**Int. Cl.[6] A47B** *96/06*
**U.S. Cl. 248—220.31** **10 Claims**




**10**. In combination a hanging apparatus and a pegboard comprising;

a) a peg board having a pegboard back and a pegboard front and a pegboard structure defining at least one pegboard aperture;

b) a hanging apparatus steadfastly rotatively secured to said pegboard; said hanging apparatus having a neck member, a helical body extending into said pegboard aperture and integrally engaged to said neck member and having a carrier member coupled to said helical body and wherein said helical body includes a first pegboard engaging helical section engaged and essentially flushed against the pegboard back and a second pegboard engaging helical section engaged and essentially flushed against the pegboard front such that said first pegboard engaging helical section and said second pegboard engaging helical section generally sandwiches a section of the pegboard therebetween in order that the hanging apparatus becomes steadfastly secured to the pegboard against any upward or downward force on the carrier member.

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**5,490,651**

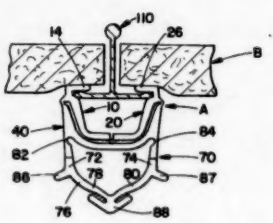
## HINGED CEILING CLIP

**Daniel J. Kump, Mentor, Ohio, assignor to Fasteners For Retail, Inc., Cleveland, Ohio**

**Filed Aug. 20, 1993, Ser. No. 109,818**
**Int. Cl.[6] A47B** *97/00*
**U.S. Cl. 248—222.12** **20 Claims**

**1**. A clip member comprising:

a first arm having first and second ends;




a second arm having first and second ends, said first and second arms being pivotally connected to each other at a first hinge located intermediate said second end of said first arm and said first end of said second arm;

a resilient biasing means hingedly connected at a first end, by a second hinge, to said first arm and at a second end, by a third hinge, to said second arm, said resilient biasing means maintaining said first and second arms in one of two stable end positions of the clip; and,

a holding means for supporting an associated object, wherein said holding means comprises a U-shaped member including a fourth hinge securing a first end of said U-shaped member to said biasing means and a fifth hinge securing a second end of said U-shaped member to said biasing means.

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**5,490,652**

**OVERHEAD SUPPORT**

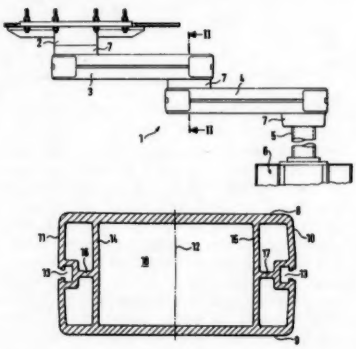
**Karl-Heinz Martin, Grafrath, Germany, assignor to Kreuzer GmbH + Co. OHG, Puchheim, Germany**

**Filed Mar. 1, 1994, Ser. No. 203,796**

**Claims priority, application Germany, Mar. 4, 1993, 43 06 803.0**

**Int. Cl.[6] E04G *3/00***

**U.S. Cl. 248—282.1** **6 Claims**




**1.** An overhead support comprising

a ceiling mount,

at least one support arm,

swivel means for connecting said support arm to said ceiling mount,

a column for carrying appliances

supply lines for said appliances,

said support arm comprising

an extruded profile having a substantially rectangular cross section, side walls, a top wall, a bottom wall, longitudinal webs extending between said top wall and said bottom wall substantially parallel to said side walls in spaced relation thereto, and a channel for said supply lines, said channel being defined by said top and bottom walls and said webs.

**5,490,653**

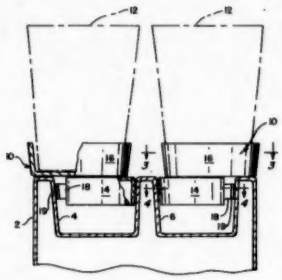
**CUP HOLDER ACCESSORY**

**John A. Ingwersen, 1050 Bryden Rd., Columbus, Ohio 43205**

**Filed Oct. 20, 1994, Ser. No. 326,381**

**Int. Cl.[6] A47K *1/08***

**U.S. Cl. 248—311.2** **6 Claims**




**1.** A cup holder accessory for supporting an over-size drink cup in a standard-size cup receptacle comprising:

a base element having a longitudinal axis;

an over-size cup receptacle element having a longitudinal axis and being rotatably supported upon said base element;

a cam element positioned within said base element, having an axis of rotation, being rotationally connected to said over-size cup receptacle element and projecting outside said base element when rotated; and

a fastener element joining said base element, said over-size cup receptacle element, and said cam element into a unitary assembly, said cam element axis of rotation being aligned with said over-size cup receptacle longitudinal axis, and said cam element and said over-size cup receptacle longitudinal axis each being laterally offset with respect to said base element longitudinal axis.

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**5,490,654**

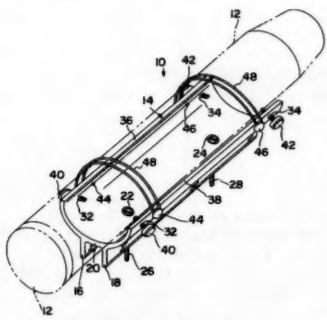
**ADJUSTABLE MOUNTING APPARATUS FOR A TELESCOPE**

**William P. Herriman, 707 Cardinal, Kerville, Tex. 78028**

**Filed Aug. 25, 1993, Ser. No. 111,610**

**Int. Cl.[6] F41G *11/00***

**U.S. Cl. 248—316.1** **10 Claims**




**1.** An adjustable mounting apparatus for supporting and holding a telescope in a predetermined position including:

an elongated semi-cylindrically shaped base support member;

a first engaging means coupled to one side of the elongated semi-cylindrically shaped base support member for adjustably locking engaging adjacently aligned side portions of the telescope;

a second engaging means coupled to the other side of the elongated semi-cylindrically shaped base support member for adjustably lockingly engaging other adjacently aligned side portions of the telescope;

a first coupling means for adjustably engaging adjacently aligned upper portions of the telescope; and

a second coupling means for adjacently engaging other adjacently aligned upper portions of the telescope so that when the first and second coupling means are coupled to engage the telescope and the first and second engaging means are moved to lockingly engage the telescope, the telescope is locked in the predetermined position.

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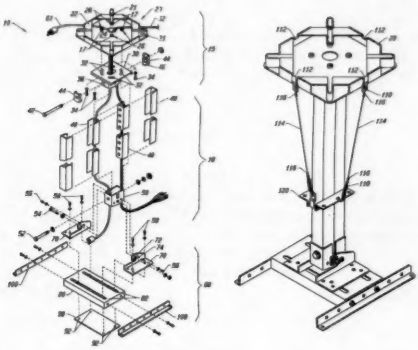
**5,490,655**

## VIDEO/DATA PROJECTOR AND MONITOR CEILING/WALL MOUNT

**Nigel P. Bates, Napa, Calif., assignor to Monger Mounts, Inc., Napa, Calif.**

**Filed Sep. 16, 1993, Ser. No. 122,757**
**Int. Cl.[6] A47H *1/10***
**U.S. Cl. 248—329** **6 Claims**



**1**. An audiovisual projector/monitor ceiling/wall mount comprising:

a ceiling/wall adapter assembly having a means for attaching to a ceiling/wall;

a strut formed by a plurality of U-shaped channels having at least one of the mounting relationships of back to back and side by side, said strut having a first and a second end, said U-shaped channels providing a first channel and a second channel separate from the first channel to run different types of cabling;

said ceiling/wall adapter assembly including locking rotational adjustment means for rotatably supporting the first end of the strut and for adjusting and locking the rotation of the strut at multiple strut rotational positions;

a projector/monitor adapter assembly having a means for supporting a projector/monitor;

a hook and bolt connector having a hook and a bolt, the hook and bolt connector attached to the second end of the strut and the projector/monitor adapter assembly whereby the strut and the projector/monitor adapter assembly are demountably attached by the hook engaging the bolt, the hook and bolt connector securing the projector/monitor adapter assembly relative to a horizontal plane;

means for slidably attaching the projector/monitor adapter assembly to the strut;

a cable with a first and a second end, the first end connected to the ceiling/wall adapter assembly and the second end connected to the strut; and

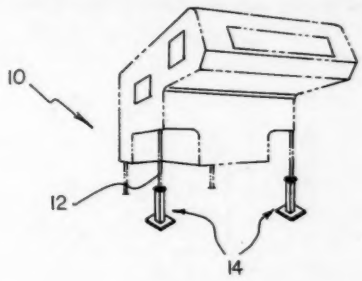
a channel cover attached to the channel of the strut to form a conduit inside the channel.

**5,490,656**

## CAMPER JACK STAND SYSTEM

**Robert M. Frisby, 1750 E. 4800 South #35, Holladay, Utah 84117**

**Filed Jan. 19, 1995, Ser. No. 375,585**
**Int. Cl.[6] A47F *5/00***
**U.S. Cl. 248—352** **10 Claims**




**1**. A new and improved camper jack stand system comprising, in combination:

at least two camper jack fabricated of steel and formed in an elongated generally rectangular configuration with an upper end and a lower end, each upper end including coupling means to permit releasable coupling to the lower surface of a camper, each lower end including a planar generally rectangular shaped foot to stabilize the jack;

at least two stands fabricated of steel and including a top segment, a bottom segment and a central segment therebetween, each stand providing additional clearance height between the ground and a camper supported by the camper jack, each stand including:

a bottom segment formed in a planar generally rectangular configuration with an upper surface and a lower surface, the lower surface being positioned upon the ground or some other recipient surface in the operative orientation, the approximate center point of the upper surface including coupling means, the bottom segment providing a stable foundation for the stand;

a central segment formed as an elongated generally rectangular shaped shaft, the central segment having an upper end and a lower end and positioned vertically in the operative orientation, the lower end being coupled to the coupling means on the upper surface of the bottom segment, at least one generally U-shaped handle being affixed to the central segment to permit easy transport by the user; and

a top segment formed in a planar generally rectangular configuration with an upper surface and a lower surface, the top segment having a greater length and width than the central segment and being positioned centrally upon the central segment, the upper surface including a generally rectangular shaped foot holder, the foot holder having three closed sides and one open side, the foot holder having a horizontal upper surface and a vertical lower surface, the lower surface being affixed to the upper surface of the top segment, the upper surface of the foot holder being positioned above its lower surface forming a slot therebetween, the slot permitting the slidable positioning of the foot of the camper jack therein, the top segment including a pair of apertures extending therethrough adjacent to the open side of the foot holder, a U-bolt being fabricated of steel and formed in a generally U-shaped configuration, the U-bolt having two free ends and a curved region therebetween, the free ends of the U-bolt adapted to be positioned through the apertures with the curved region facing upward, a chain formed of a plurality of links coupling the U-bolt to the top segment, the U-bolt preventing inadvertent decoupling of a jack positioned therein.

**5,490,657**

## SEAT, IN PARTICULAR A VEHICLE SEAT

**Hermann Meiller; Matthias Mayer, both of Amberg, and Josef Hoerner, Regensburg, all of, Germany, assignors to Grammer AG, Amberg, Germany**

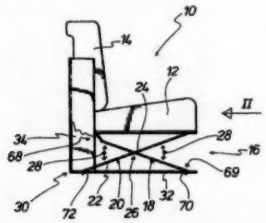
**PCT No. PCT/EP93/00787, § 371 Date Oct. 3, 1994, § 102(e) Date Oct. 3, 1994, PCT Pub. No. WO93/19950, PCT Pub. Date Oct. 14, 1993**

**PCT Filed Apr. 1, 1993, Ser. No. 313,295**

**Claims priority, application Germany, Apr. 3, 1992, 42 11 093.9**

**Int. Cl.[6] F16M** *13/00*

**U.S. Cl. 248—588** **6 Claims**




**1**. A seat, in particular a vehicle seat, comprising a spring means (**36**) whose springing characteristic can be adjusted as desired, wherein the seat (**10**) has an L-shaped base means (**30**) with a bottom element (**32**) and a back element (**34**) which projects upwardly from the bottom element (**32**) and a scissor support assembly (**16**) is arranged on the bottom element (**32**), characterised in that a two-armed pivot lever (**38**) is mounted on the back element (**34**) pivotably about a central mounting axis (**40**), a spring means (**36**) which has at least one tension spring (**48**) being fixed by its one end portion (**50**) to one arm (**44**) of the pivot lever (**38**), the second end portion (**54**) of the spring means (**36**) being fixed in axially at least approximately aligned relationship with the mounting axis (**40**) to a fixing portion (**56**) of a support lever (**58**) which is provided in the vicinity of the arm (**44**), having the spring means (**36**), of the pivot lever (**38**) and is mounted pivotably by a mounting portion (**60**) to the back element (**34**) and is pivotally connected to the scissor support assembly (**16**).

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**5,490,658**

## LABEL HANGERS FOR INTRAVENOUS BOTTLES

**Roderick T. Coward, and Andrew H. Whipp, both of Mississauga, Canada, assignors to Avery Dennison Corporation, Pasadena, Calif.**

**Filed Mar. 2, 1995, Ser. No. 398,362**

**Int. Cl.[6] F16M** *3/00*

**U.S. Cl. 248—683** **20 Claims**

**1**. A label hanger and intravenous (I.V.) bottle assembly, wherein said label hanger suspends said I.V. bottle upside-down from a hook of an I.V. stand, comprising:

an I.V. bottle;

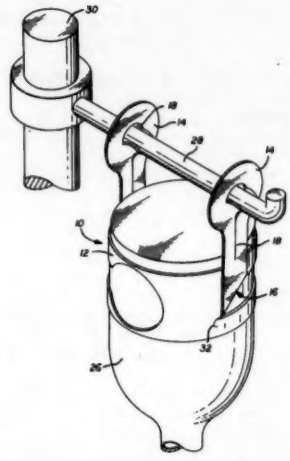
a label sheet having a pair of hang tabs cut therein, each said hang tab being integral at one end thereof with said label sheet and engageable at the other end thereof with the hook of the I.V. stand; and

an adhesive coating applied in a pattern to one side of said label sheet, said adhesive coating substantially covering all areas of said label sheet except for the areas defined by said hang tabs which are free of adhesive;

said label sheet being wrapped around said I.V. bottle and being adhered thereto by said adhesive coating;

said hang tabs having break-away ties for holding said tabs to the remainder of said label sheet as said label hanger is being applied to said I.V. bottle;

said break-away ties being integral with said label sheet but of very brief extent between said hang tabs and the remainder of said label sheet; and




the area of said I.V. bottle beneath said hang tabs being free of adhesive both before and after said ties are broken and said hang tabs are extended to engage with the hook of the I.V. stand.

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**5,490,659**

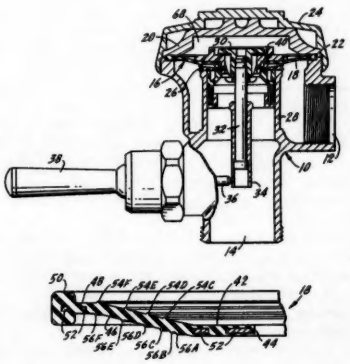
## REINFORCED DIAPHRAGM FOR FLUSH VALVES

**John F. Whiteside, Franklin Park, Ill., assignor to Sloan Valve Company, Franklin Park, Ill.**

**Filed Dec. 19, 1994, Ser. No. 358,270**

**Int. Cl.[6] F16K** *31/145*

**U.S. Cl. 251—40** **12 Claims**



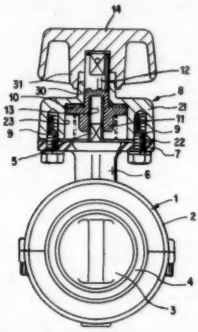

**1**. A diaphragm-type of flush valve for use with toilet devices such as urinals and water closets including a body having an inlet and an outlet, a valve seat between said inlet and outlet and a valve member movable to a closing position on said valve seat to stop flow between said inlet and outlet, said valve member including a diaphragm peripherally attached to said body, the diaphragm having a plurality of reinforcing rings formed thereon, the reinforcing rings being spaced more closely together at the interior of the diaphragm that at its periphery with such spacing being geometrically progressive from the interior of the diaphragm to its periphery.

**5,490,660**

## MANUAL DEVICE FOR VALVE

**Jiro Kamezawa, Osaka, Japan, assignor to Tomoe Technical Research Company, Osaka, Japan**

**Filed Jan. 17, 1995, Ser. No. 373,971**
**Claims priority, application Japan, Feb. 9, 1994, 6-036639**
**Int. Cl.[6] F16K** *35/02*
**U.S. Cl. 251—96** **6 Claims**



**1**. In a valve having a movable valve opening member pivoted rotatably and positioned in a valve body for the opening and closing of a fluid passage, a manual device for the valve opening member comprising;

a notch plate slidably connected to one end of a stem which pivotably holds the opening member wnerein the notch plate moves freely in the axial direction along a portion of the stem towards the valve and rotates synchronously with the stem;

a manually operative knob is secured to an upper portion of the notch plate extending exteriorly thereof for operating the valve member between open and closed positions;

a casing secured to an upper portion of the valve body wherein the casing contains the notch plate and guides the notch plate movement freely in the axial direction and guides rotation of the notch plate therein as the operative knob is moved axially and then rotated for moving the valve member towards either one of a valve open position and a valve closed position; and

a notch means provided on an interior portion of the casing for preventing extra rotation of the notch plate when there is engagement between the notch plate and the interior casing wherein the notch plate is constantly pressurized within the casing to maintain engagement with the notch means when the operative knob is moved, the notch plate moves axially in a direction along a portion of the valve stem away from the valve member, and the notch plate moves the valve member to either one of valve open position and a valve closed position.

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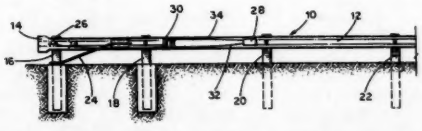
**5,490,661**

## QUICK RELEASE SYSTEM FOR GUARDRAIL TERMINALS

**David J. Stevens; Joseph B. Mayer, Jr., and Kirk A. Marchand, all of San Antonio, Tex., assignors to Southwest Research Institute, San Antonio, Tex.**

**Filed Sep. 29, 1994, Ser. No. 314,741**
**Int. Cl.[6] E01F** *15/04*
**U.S. Cl. 256—13.1** **7 Claims**



**1**. A quick release system for guardrail terminals, comprising,

a displacement sensor positioned adjacent to the end of the guardrail for measuring the acceleration of a vehicle's impact,

a monitoring unit connected to the sensor measuring the acceleration of the impact and providing an actuation signal when the acceleration exceeds a predetermined value for a predetermined length of time, and

a quick release coupling connected to and forming a connection between first and second separated portions of the guardrail, said coupling having an explosively actuated release mechanism connected to and actuated by the monitoring unit.

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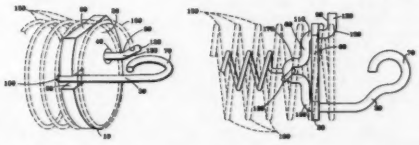
**5,490,662**

## GARAGE-DOOR SPRING REINFORCEMENT AND REPAIR KIT

**Michael A. Wright, 141 Main St., Exxex Junction, Vt. 05452**

**Filed Mar. 29, 1995, Ser. No. 412,463**
**Int. Cl.[6] F16B** *1/00*
**U.S. Cl. 267—74** **14 Claims**



**1**. A safety reinforcement and repair kit for a garage-door spring having first and second spring ends, a wire diameter, a coil axis, a coil inner diameter, and a relaxed length, and being characterized by a spring constant, comprising:

a) a rigid hook element having first and second cads, said first end having a hook for fastening one of said first and second garage-door spring ends to a fixed support, and said second end having a retaining portion, and

b) a rigid disk having a thickness, a center, and a rim defining a disk diameter, said disk diameter being larger than the garage-door spring inner diameter, said disk having an aperture through which said hook element is inserted, said disk having a slot extending inwardly from said rim sufficiently to removably engage said retaining portion of said hook element for preventing rotation of said hook element, and

said rim of said disk having a flat portion disposed for contacting a wire diameter of the garage-door spring when said disk is inserted into one of said first and second garage-door spring ends to attach said hook to a fixed support.

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**5,490,663**

## SLIDE ACTUATED HOLDING CLAMP

**Dragan B. Stojkovic, Wyandotte, and George L. Justus, Northville, both of Mich., assignors to United Technologies Automotive, Inc., Dearborn, Mich.**

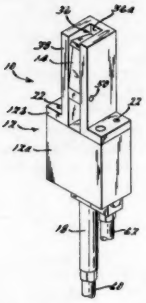
**Continuation-in-part of Ser. No. 927,450, Aug. 7, 1992, Pat. No. 5,277,411. This application Oct. 1, 1993, Ser. No. 130,380**
**Int. Cl.[6] B23Q** *3/08*
**U.S. Cl. 269—32** **7 Claims**

**1**. A slide actuated holding clamp apparatus for holding a connector stationary while a push test is being performed on at least one conductor secured to said connector, in response to linear movement of a drive element, said apparatus comprising:

a body portion having a bore extending at least partially therethrough and an opening formed therein in communication with said bore;

a locking member disposed within said opening of said body portion, said locking member including a locking shoulder portion;

actuating means disposed slidably within said opening for causing said locking member to be urged into first and second locked positions relative to said connector in response to movement of said actuating means in a first direction by said



drive element, and for urging said locking member out of locking engagement with said connector when said actuating means is moved in a second direction by said drive element;

said locking member including means cooperable with said actuating means for causing said locking member to be urged into said first locked position with said connector as said drive element is moved in said first direction; and

said locking member including second means for allowing said locking member to be moved generally longitudinally within said opening into said second locked position as said drive element is further urged in said first direction, said second locked position causing said locking member to exert a positive clamping force against said connector to hold said connector securely during said push test;

said actuating means including a sloped portion;

said body portion including a locking pin extending at least partially therethrough; and

said locking pin abuttingly engaging said sloped portion to thereby urge said actuating means away from said locking pin as said actuating means is urged in said first direction, thereby causing said locking member to be urged pivotally such that said locking shoulder portion is urged outwardly of said opening of said body portion into abutting engagement with said connector.

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**5,490,664**

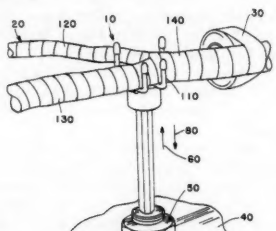
**UNIVERSAL FORK WIRE HARNESS ASSEMBLY JIG**

**George L. Justus, Northville, and Vladimir Karasik, Oak Park, both of Mich., assignors to United Technologies Automotive, Inc., Dearborn, Mich.**

**Filed Jan. 31, 1994, Ser. No. 189,377**

**Int. Cl.[6] B23Q** *3/00*

**U.S. Cl. 269—66** **6 Claims**



1. A jig for supporting a plurality of wires for bundling and taping, the jig comprising:

a head having a base and at least one removable tine, said base having a plurality of channels formed therein adapted to receive said at least one tine and said at least one tine adapted to be received in at least one of said channels and to extend from said base to form a support member by which said plurality of wires are supported for bundling, said tine having a locating means and each of said channels having at least one receptacle for receiving the locating means of said tine whereby said tine rests in at least one of said channels and said locating means is received in one of said at least one receptacle;

a retainer for retaining said at least one tine on the base of said head;

a shaft having a first end upon which said head is removably secured; and

a mounting member adapted for mounting said shaft to a work surface, said mounting member further adapted to selectively secure said shaft in a first position and further adapted to selectively release said shaft from said first position to a second position.

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**5,490,665**

**PIVOTABLE STOP FOR MACHINE TOOLS**

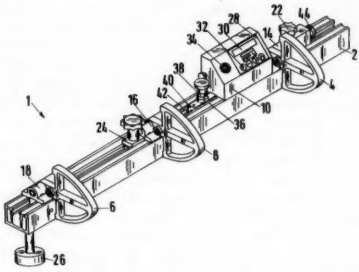
**Siegfried Thiele, and Rolf Tweer, both of Minden, Germany, assignors to Wilhelm Altendorf GmbH & Co. KG, Minden, Germany**

**Continuation of Ser. No. 212,359, Mar. 14, 1994, abandoned. This application May 9, 1995, Ser. No. 437,693**

**Claims priority, application Germany, Mar. 16, 1993, 93 03 843.7**

**Int. Cl.[6] B23Q** *3/00*

**U.S. Cl. 269—303** **6 Claims**



1. A crosscut fence for machine tools, in particular panel saws, having a guide bar, on which a first pivotable throwover stop is mounted in a longitudinally displaceable but fixed manner, and is connected to a measurement and display unit which determines and displays the relative position of the pivotable throwover stop to the guide bar, and in which a rod can be telescopically extended and retracted, which bears a second pivotable throwover stop at its free end, characterized in that a coupling placed at the measurement and display unit detachably connects the rod to the measurement and display unit, and in that the coupling consists of a stop bolt which can move transversely to the longitudinal axis of the rod, and which can be introduced into a bore in the rod.

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**5,490,666**

**FOLDER WITH SPRING-BIASED EXIT ROLLER**

**Kevin F. Albert, Barrington, N.H., assignor to Heidelberger Druchemaschiner AG, Heidelberg, Germany, and Heidelberg Harris, Inc., Dover, N.H.**

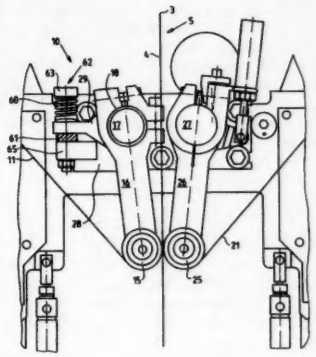
**Filed Aug. 29, 1994, Ser. No. 297,728**

**Int. Cl.[6] B41F** *13/58;* **B65H** *5/02;* **B65G** *15/14*

**U.S. Cl. 270—5** **11 Claims**

1. A folder apparatus comprising:

at least one lead-in tape mechanism having a first lead-in tape and first exit roller and a corresponding second lead-in tape



and second exit roller, the first and second lead-in tapes forming a signature passage for delivery of a signature;

the first exit roller rotatable about a first roller axis but otherwise fixed; and

a lever for supporting the second exit roller, the second exit roller rotatably mounted on the lever about a second roller axis;

an arm connected to the lever, the arm having a first side and an opposing second side;

a first spring acting against the first side of the arm to urge the lever and second exit roller in the direction of the first exit roller; and

a second spring acting against the second side of the arm.

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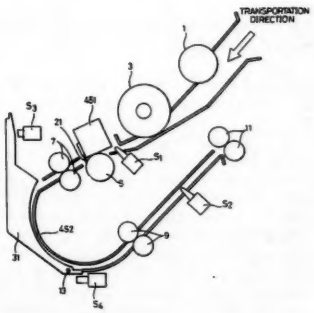
**5,490,667**

**SHEET TRANSPORTATION APPARATUS CARRYING OUT ERROR DETERMINATION CONSIDERING SWITCHING OF SHEET TRANSPORTATION PATH**

**Teruo Nagashima, Sagamihara; Satoshi Oba, Machida; Tomomi Ishizuka, Hachiouji, and Hiroyuki Masuda, Isehara, all of, Japan, assignors to Minolta Co., Ltd., Osaka, Japan**

**Filed Aug. 30, 1994, Ser. No. 297,844**
**Claims priority, application Japan, Aug. 31, 1993, 5-215591**
**Int. Cl.[6] B65H** *5/00*
**U.S. Cl. 271—225** **17 Claims**




1. A sheet transportation apparatus comprising:

a first transportation path,

a second transportation path located downstream of said first transportation path,

a guide member provided at the connection of said first and second transportation paths movable between a first position guiding a sheet transported from said first transportation path to said second transportation path and a second position leading to a direction other than said second transportation path,

a sensor for detecting the position of said guide member,

a counter responsive to an output of said sensor indicating that said guide member is not located at said first or second position for initiating counting of a predetermined time period, and

a determination unit for making determination of an error when counting by said counter ends, and when said guide member is not located at said first or second position.

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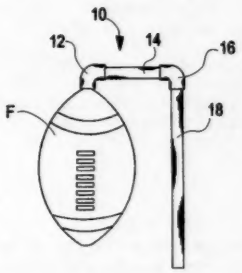
**5,490,668**

**FOOTBALL PRACTICE PLACE-KICKING TEE**

**James L. Ritch, Arcadia, Fla., assignor to Steve Duke, Port Charlotte, Fla.**

**Filed Nov. 2, 1994, Ser. No. 333,437**
**Int. Cl.[6] A63B** *67/00*
**U.S. Cl. 273—55 B** **2 Claims**




1. A football practice place-kicking tee for holding an American football in a substantially upright position for practice kicking, comprising:

an inverted substantially L-shaped member, said member having first and second elongated leg sections and each leg section having first and second ends, said first end of said first leg section being rigidly connected to said first end of said second leg section by a right angle (90°) elbow connector member;

a second right angle (90°) elbow being rotatably connected to said second end of said first leg section and being freely rotatable thereon;

said second leg section having a length substantially greater than the length of an American football and said second end thereof being loosely insertable into the ground to thereby place said second leg section substantially vertical and said first leg section substantially horizontal and spaced from the ground;

said second elbow, having a downwardly facing open free end for engaging the upper end of an American football when held upright by said L-shaped member, will freely rotate on said second end of said first leg and said second leg will rotate about its longitudinal axis.

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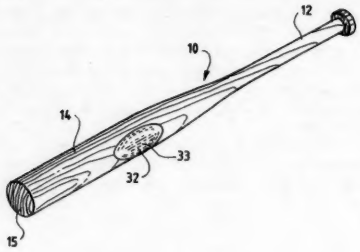
**5,490,669**

**LAMINATED BALL BAT**

**Merlin L. Smart, 134 Zimmerman Rd., Kalispell, Mont. 59901**

**Continuation of Ser. No. 222,163, Apr. 4, 1994, Pat. No. 5,388,363, which is a continuation of Ser. No. 959,434, Oct. 13, 1992, abandoned. This application Oct. 20, 1994, Ser. No. 326,475**
**Int. Cl.[6] A63B** *59/06*
**U.S. Cl. 273—72 R** **11 Claims**

1. A laminated ball bat having a handle end and a barrel end, said laminated ball bat comprising:




first and second laminae cut from an elongate wood block, the elongate wood block having a) first and second spaced ends spaced lengthwise of the elongate wood block and b) grain running lengthwise between the first and second ends,

said first and second laminae each having first and second ends corresponding to the first and second ends of the elongate wood block and at least one curved growth ring portion opening in a direction transverse to a line extending between the first and second ends of each of the first and second laminae,

said first and second laminae in the ball bat oriented so that the growth ring portions are substantially mirror images of each other and the first ends of the first and second laminae are at the barrel end of the ball bat and the second ends of the first and second laminae are at the handle end of the ball bat.

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**5,490,670**

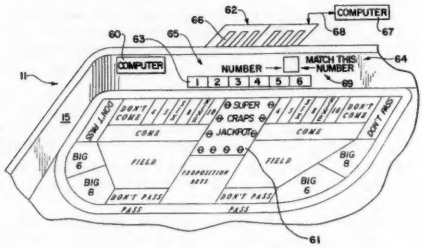
**CRAPS LAYOUT ARRANGEMENT WITH JACKPOT WAGERING AREA AND RANDOMIZED JACKPOT SEQUENCES**

**Marcus V. Hobert, 3318 Kenwood Ave., Davenport, Iowa 52807**

**Continuation-in-part of Ser. No. 305,178, Sep. 13, 1994. This application Feb. 16, 1995, Ser. No. 389,537**

**Int. Cl.[6] A63F** *3/00*

**U.S. Cl. 273—138 A** **42 Claims**




2. An amusement device including:

a pair of dice each having six faces bearing a visual representation of the numbers one through six, said dice being of a size for manually rolling to present one of eleven different numbers which define a plurality of point numbers, at least one natural number, and at least one craps number;

a gaming layout to provide a flat surface upon which said dice may be rolled and upon which bets may be laid by physical placement of wagers, said flat surface including indicia thereon representing a plurality of wager areas, said wager areas including:

(a) a pass line area .for receiving a wager betting both

(i) that one or more rolls of dice will yield an established first point number without rolling the number "7"; and

(ii) that a natural number is rolled prior to establishing the first point number or prior to rolling a craps number;

(b) a don't pass area for receiving a wager betting both

(i) that one or more rolls of the dice will yield the number "7" prior to the rolling of an established first point number; and

(ii) that a craps number is rolled prior to establishing the first point number or prior to rolling a natural number;

(c) a jackpot area for receiving a wager that a set of a plurality of dice outcomes are rolled, said set having a remote probability of occurrence; and

(d) random generation means for randomly generating said dset of plurality of dice outcomes.

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**5,490,671**

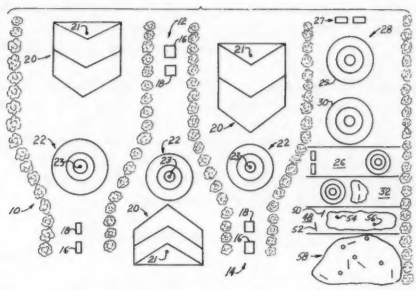
**TARGET GOLF COURSE AND GAME**

**Roy W. Picard, P.O. Box 89, North Turner, Me. 04266**

**Filed Apr. 26, 1995, Ser. No. 429,190**

**Int. Cl.[6] A63B** *67/02*

**U.S. Cl. 273—176.4** **16 Claims**




1. A golf game comprising a golf course laid out with long distance and short distance holes and a putting course:

said long distance holes comprising a predetermined plurality of long distance holes, each including two teeing areas and a longer distance driving target and a shorter distance bullseye target;

at least one short distance hole including two teeing areas and at least one bullseye target; and

a putting course with a putting green, a predetermined order of play, and a predetermined number of holes.

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**5,490,672**

**GOLF SWING PRACTICE/TRAINING DEVICE**

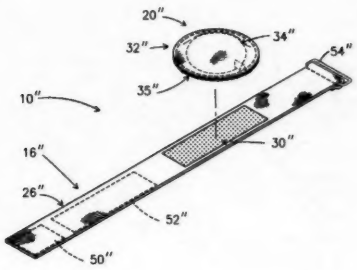
**Chris Johnston, 29 Monroe Pl., Unit B, Staten Island, N.Y. 10314**

**Continuation-in-part of Ser. No. 216,299, Mar. 23, 1994, Pat. No. 5,375,843. This application Dec. 22, 1994, Ser. No. 361,772**

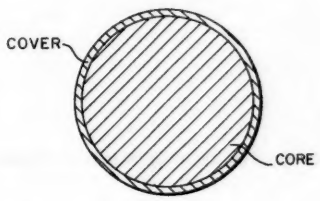
**Int. Cl.[6] A63B** *69/36*

**U.S. Cl. 273—187.2** **8 Claims**

1. A golf swing practice/training device configured to generate a signal when the power arm of a golfer is properly moved from the top of the backswing to the slot position in the downswing comprising an attachment element to mount the golf swing practice/training device to the power arm of the golfer and having a signal generator detachably attached to said attachment element by a signal generator mounting means for detachably attaching said signal generator to different locations on said attachment element so that said signal generator maybe disposed adjacent the golfer's power arm to engage the side of the golfer's upper body to activate said signal generator when the golfer's power arm is properly positioned relative to the golfer's body during the downswing, said attachment element comprises a strap to receive said signal generator therein, said signal generator comprises a compressible element capable of generating an audible sound when compressed by a golfer's power arm engaging the side of the golfer's body.

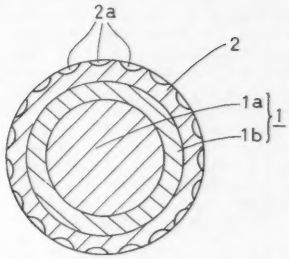



**5,490,673**
**GOLF BALL**
**Hidenori Hiraoka, Kobe, Japan, assignor to Sumitomo Rubber Industries, Ltd., Hyogo, Japan**
**Filed May 17, 1994, Ser. No. 243,786**
**Claims priority, application Japan, May 20, 1993, 5-142908**
**Int. Cl.[6] A63B** *37/12*
**U.S. Cl. 273—220** **4 Claims**



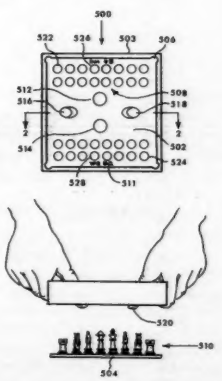

**1**. A golf ball having a two-layer structure comprising:
a core; and
a cover for coating the core;
wherein said core has a compressive strain of 2.8 to 3.8 mm, said compressive strain being the amount of deformation occurring between application of an initial load of 10 kg and a final load of 130 kg;
wherein said core has a hardness distribution measured by a JIS-C type hardness tester adjusted to (a) 65 to 79 at the center of said core, (b) 70 to 80 at a location which is 5 mm away from the center to the surface of said core, (c) 73 to 80 at a location which is 10 mm away from the center to the surface, (d) 75 to 82 at a location which is 15 mm away from the center to the surface, and (e) 70 to 85 at the surface, with the difference in hardness between adjacent locations of measurement (a), (b), (c), (d) and (e) being within 5;
wherein said cover contains an ionomer resin as a main material and has a stiffness of 1400 to 3000 kg/cm$^2$; and
wherein said golf ball has a ball compression of 70 to 100.

**5,490,674**
**THREE-PIECE SOLID GOLF BALL**
**Akihiko Hamada, Kakogawa; Yoshimasa Koizumi; Hidenori Hiraoka, both of Kobe, and Yoshikazu Yabuki, Akashi, all of, Japan, assignors to Sumitomo Rubber Industries, Ltd., Hyogo, Japan**
**Filed Dec. 28, 1994, Ser. No. 365,118**
**Claims priority, application Japan, Dec. 28, 1993, 5-353233**
**Int. Cl.[6] A63B** *37/06*
**U.S. Cl. 273—228** **3 Claims**




**1**. A three-piece solid golf ball comprising a two-piece solid core and a cover for covering the two-piece solid core, said two-piece solid core being composed of a center and an outer shell covering said center, wherein the center, the outer shell and the cover have the following characteristics respectively:
(1): Center
Diameter: 30.7 to 39.5 mm
Physical properties: stiffness: 300 to 2,500 kgf/cm$^2$
shore D hardness: 30 to 55
Composition: vulcanized rubber obtained from a butadiene rubber, co-crosslinkable monomer, zinc oxide and peroxides as an essential component
(2) Outer shell
Thickness: 1.0 to 4.0 mm
Physical properties: stiffness: 2,500 to 6,000 kgf/cm$^2$
shore D hardness: 55 to 75
Composition: vulcanized rubber obtained from a butadiene rubber, a co-crosslinkable monomer, zinc oxide and peroxides as an essential component
(3): Cover
Thickness: 0.6 to 2.0 mm
Physical properties: stiffness: 1,000 to 2,500 kgf/cm$^2$
shore D hardness: 40 to 55
Composition: cover obtained from an ionomer resin or a mixture of the ionomer resin and a flexible resin as a base resin.

**5,490,675**
**GAME SET AND STORAGE SYSTEM**
**Andre M. Persidsky, and Maxim D. Persidsky, both of 35 Temescal Ter., San Francisco, Calif. 94118**
**Continuation-in-part of Ser. No. 118,444, Sep. 7, 1993, Pat. No. 5,413,352. This application Nov. 16, 1994, Ser. No. 340,704**
**Int. Cl.[6] A63F** *3/02*
**U.S. Cl. 273—287** **21 Claims**




**10**. In a game set: a plurality of game pieces, a single holder comprising a base having a top surface, a plurality of compartments formed in the base and opening through the top surface for

holding all of the game pieces in an inverted position with the lower surfaces of the game pieces facing in an upward direction, a game board disposed on the top surface in an inverted position with a playing surface on one side of the board facing in a downward direction, means for positioning the board in a predetermined position on the top surface of the holder, and means releasably securing the board to the holder, so that when all of the game pieces are positioned inverted in the compartments, and the inverted game board is secured to the top surface of the holder in the predetermined position, the game board and the holder can be flipped over, so that when the holder is released and removed from the game board, all of the game pieces are simultaneously positioned on the playing surface of the game board.

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**5,490,676**

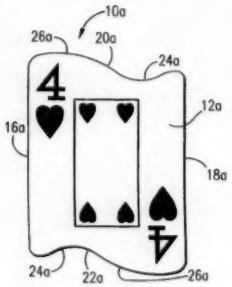
**PLAYING CARDS WITH GRIPPING SURFACE**

**Lance G. Rake, 917 Illinois St., Lawrence, Kans. 66044, and Kermit T. Krantz, 12310 Granada, Leawood, Kans. 66209**

**Filed Aug. 2, 1995, Ser. No. 510,193**

**Int. Cl.[6] A63F** *1/02*

**U.S. Cl. 273—294** **9 Claims**




1. A playing card comprising:
a front face;
a rear face;
a pair of elongated, opposed side edges; and
a pair of elongated, opposed end edges extending between said side edges, each of said end edges presenting a concavo-convex shaped curved surface for facilitating gripping of the playing card.

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**5,490,677**

**AMUSEMENT APPARATUS**

**Alan J. Black, Ledstone, England, assignor to Sound Leisure Limited, Leeds, United Kingdom**

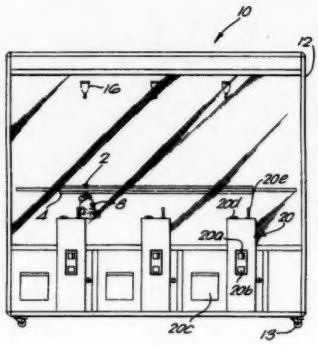
**Filed Nov. 16, 1994, Ser. No. 340,621**

**Claims priority, application United Kingdom, May 25, 1994, 9410161**

**Int. Cl.[6] A63F** *9/02*

**U.S. Cl. 273—351** **11 Claims**

1. Amusement apparatus comprising a number of targets located beneath at least one striker and means for providing relative movement between the two, the or each striker being operatively connected to a user activated mechanism whereby the or each striker may be caused by the user to approach the targets, the targets being operatively connected to a reward mechanism whereby should a striker hit a particular target the reward mechanism is triggered, wherein said at least one striker is automatically retrieved after each activation from a "fired" position close to or adjacent the targets, to a stowed position some distance away from the targets, so as to be ready for the next activation.

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**5,490,678**

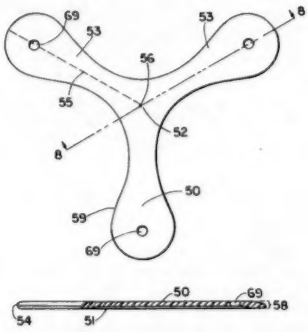
**AMBIDEXTROUS BOOMERANG**

**Eric Darnell, 46 Douglas La., Norwich, Vt. 05055**

**Continuation-in-part of Ser. No. 84,743, Aug. 13, 1987, Pat. No. Des. 312,480. This application Nov. 26, 1990, Ser. No. 617,631**

**Int. Cl.[6] A63B** *65/08*

**U.S. Cl. 273—426** **4 Claims**




4. A one-piece, homogeneous boomerang suitable for indoor use, throwable by left or right handed persons to return to the thrower comprising:
a. a solid, imperforate center portion;
b. two sides, each opposing the other, said sides joining one to the other defining the periphery of said boomerang, said periphery being essentially planar;
c. three arms radiating symmetrically from said center portion, said arms having symmetric leading and trailing edges about their radial axes, each arm being like another;
d. said arms having cross-section al areas transverse to their radial axes first decreasing then increasing outwardly along the radial axes of said arms, greater mass being at the extremity than proximate said center portion, said arms having tips being generally bulbous;
e. said arms each having a raised portion running inwardly along the radial axis of each of said arms towards said center portion, joining at said center portion one raised portion to another, said raised portions being all on a common side;
f. said side opposite said side containing said raised portions being essentially planar;
g. the height perpendicular to said planar periphery decreasing outwardly along the axis of said arms;
h. said boomerang being made of polyethylene foam;
wherein the side opposite said side which contains said raised portions is concave along the radial axis of each of said arms with

said concavity running inwardly towards said center portion where said concavities join one to another to from a concave surface on said center portion on said side opposite said side which contains said raised portions, and said arms are axially apertured on said tips proximate a radial position of maximum radial cross-sectional area of the arms.

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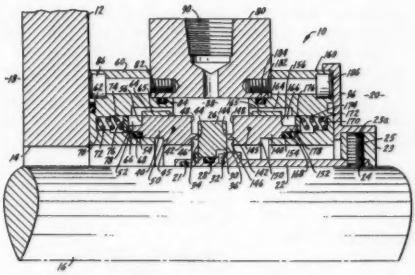
**5,490,679**

**SEAL RING DESIGN**

**Thomas Borrino, Glendale Heights, and Mark E. Kraft, Berwyn, both of Ill., assignors to John Crane Inc., Morton Grove, Ill.**

**Filed Dec. 20, 1993, Ser. No. 170,524**
**Int. Cl.[6] F16J** *15/16*
**U.S. Cl. 277—65** **20 Claims**



**1**. A mechanical end face seal for providing fluid tight sealing between a housing containing a fluid and a shaft extending through an aperture in the housing, the shaft rotating relative to the housing, the seal comprising:

a) a first seal ring having a generally radially extending sealing face;

b) a second seal ring having a generally radially extending sealing face shaped and dimensioned to be in opposite mating relationship to the sealing face of said first seal ring, the portions of said second ring sealing face which sealingly engage said first ring sealing face defining a seal interface, one of said first or second seal rings being disposed coaxially with said shaft and being nonrotatably connected with and sealed against the housing, and the other of the rings being sealed to and connected coaxially with the shaft to rotate therewith, one of said rings being disposed within a retaining element and being movable axially relative to the retaining element; and

c) a biasing means adapted to urge the axially movable ring toward the other ring to bring the sealing faces close to each other to provide a rotatable sealing engagement relative to one another,

said axially movable seal ring further comprising a radially extending back face, removed from and oppositely disposed from the sealing face of the axially movable seal ring, said back face including a first shoulder disposed adjacent the outer diameter portion of the axially movable seal ring, and a second shoulder disposed on said back face adjacent an inner diameter portion of the axially movable seal ring, said first and second shoulders at least partially defining a protruding annular flange extending axially from the seal ring back face, said protruding annular flange having an outer diameter surface and an inner diameter surface, said flange outer diameter surface partially defining an annular outer section extending between said flange outer diameter surface and said retaining element, said annular outer section having at least an axial dimension and a radial dimension, said flange inner diameter surface at least partially defining said second shoulder, said second shoulder being shaped dimensioned and configured to receive a means for sealing between said flange inner diameter surface and said retaining element within which said axially movable ring is disposed, said annular outer section and said second shoulder being shaped, dimensioned and configured to position the centroid of the axially movable seal ring closer to the seal interface and to the inner diameter surface of the axially movable seal ring.

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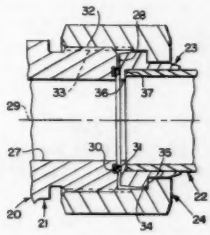
**5,490,680**

**CAPTIVE O-RING FACE SEAL**

**Hiralal V. Patel, Dublin, and Edward M. Fernandes, Eaton, both of Ohio, assignors to Parker-Hannifin Corporation, Cleveland, Ohio**

**Filed Apr. 6, 1993, Ser. No. 43,364**
**Int. Cl.[6] F16J** *15/10*
**U.S. Cl. 277—170** **20 Claims**



**1**. A face seal comprising a metal body having a transverse sealing face, an annular groove in said sealing face, said annular groove having radially outer and inner side walls and a bottom wall, and metallic means integral with said metal body and protruding radially from one of said radially outer and inner side walls toward the other of said radially outer and inner side walls at said sealing face to form an undercut; and an annular seal in said groove, said annular seal being trapped axially behind said metallic means integral with said metal body to prevent said annular seal from falling out of said groove; and wherein said metallic means integral with said metal body is deformed and stressed beyond its elastic limit and has an axially outer flat planar surface flush and continuous with said sealing face adjacent said groove.

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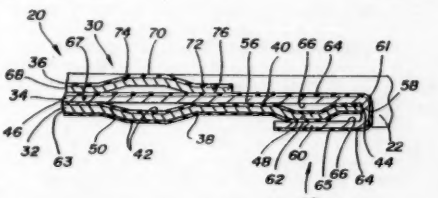
**5,490,681**

**THREE LAYER METAL GASKET WITH DUAL COATING**

**Thomas P. Plunkett, Lemont, and Michael J. Kestly, Bolingbrook, both of Ill., assignors to Dana Corporation, Toledo, Ohio**

**Filed Sep. 22, 1994, Ser. No. 310,919**
**Int. Cl.[6] F10J** *15/08*
**U.S. Cl. 277—235 B** **19 Claims**



**1**. A cylinder head gasket of an internal combustion engine comprising:

three metal plates forming layers of said gasket;

at least one combustion seal and at least one fluid flow seal;

a first metal plate with a first opening and a second opening spaced away from said first opening, said first metal plate forming a first portion of said combustion seal and a first portion of said fluid flow seal;

a second metal plate with a base portion disposed above said first plate, a curved portion extending away from said base portion, and a flange extending away from said curved portion that is spaced away and generally parallel to said base portion to form a second portion of said combustion seal, an outer periphery of said first opening of said first plate disposed between said base portion and said flange, said second metal plate having an opening corresponding to and generally aligned with said second opening of said first metal plate to form a second portion of said fluid flow seal; and

a third metal plate adapted to form a third portion of said fluid flow seal adjacent to said second plate, said third metal plate having an inwardly facing side in facing relation to said base portion of said second plate, but in a non-overlapping orientation with said flange of said second plate, said third metal plate having an opening corresponding to and generally aligned with said second opening of said first metal plate and said opening of said second metal plate and wherein a portion of said second plate is positioned between said first plate and said third plate.

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**5,490,682**

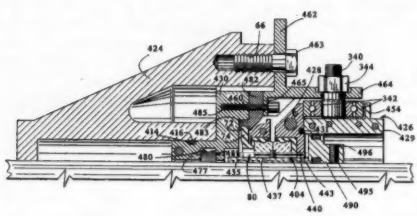
## SPLIT MECHANICAL FACE SEAL

**Jon J. Radosav, Glenview; David M. Dudek, Schaumburg; Orest T. Browar, Chicago, and Angelo G. Ralle, Palatine, all of Ill., assignors to John Crane Inc., Morton Grove, Ill.**

**Continuation of Ser. No. 42,867, Apr. 5, 1993, abandoned, which is a continuation-in-part of Ser. No. 805,470, Dec. 10, 1991, Pat. No. 5,199,720, which is a continuation of Ser. No. 529,208, May 25, 1990, Pat. No. 5,114,163. This application Feb. 21, 1995, Ser. No. 391,619**

**Int. Cl.[6] F16J** *15/38*

**U.S. Cl. 277—815** **20 Claims**



1. A split mechanical face seal for providing fluid-tight sealing between a housing and a shaft adapted to rotate relative thereto, said split seal comprising:

adjacent, rigid, annular, primary and mating rings formed of a plurality of arcuate ring segments, each defining generally radial, opposed sealing faces;

means for joining and retaining the ring segments of each of said rings in rigid connection with the other segments of each ring, whereby each said opposed sealing face defined by said rings has a smooth surface devoid of discontinuities around its complete circumference, said joining and retaining means further comprising:

a resilient split means for said primary ring and a resilient split means for said mating ring, each said resilient split means positioning and supporting its associated ring in a generally coaxial relationship with the shaft and with the other ring, so that the sealing face of each said ring is in opposite and facing relationship to the sealing face of the other said ring, said resilient split means for said primary ring rigidly supporting said primary ring from axial and radial movement, said resilient split means for said mating ring nonrigidly supporting said mating ring and biasing said mating ring in an axial direction against said primary ring;

a split holder means for said mating ring and a split holder means for said primary ring, said split holder means for said mating ring circumferentially connecting said mating ring resilient split means to said mating in a substantially concentric relationship, said split holder means for said primary ring circumferentially connecting said primary ring resilient split means to said primary ring in a substantially concentric relationship, each said split holder means comprising a pair of semicircular holder members releasably attachable to each other and when in an attached condition, sealingly engaging and compressing to a limited degree at least a portion of each said respective resilient split means upon its associated segmented ring; and

a relative axial positioning means for maintaining the position of the split mating ring holder means relative to the split primary ring holder means in a substantially identical relative axial position during shaft rotation, said relative axial positioning means comprising at least one positioning member for axially positioning one of the mating ring holder means or the primary ring holder means relative to the other of the holder means while simultaneously permitting relative rotation of one said holder means relative to the other, said relative axial positioning means enabling said split mechanical face seal to compensate for relative temporary large axial displacements of the primary ring holder means relative to the mating ring holder means.

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**5,490,683**

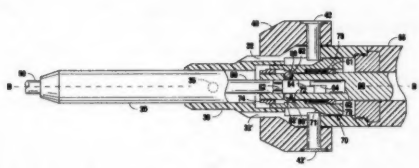
## TOOL SHAFT COUPLER

**Thomas J. Mickel, Jupiter, and Stewart W. Willason, Palm Beach Gardens, both of Fla., assignors to Mednext Inc., Riviera Beach, Fla.**

**Filed Jul. 27, 1994, Ser. No. 281,489**

**Int. Cl.[6] B23B** *31/107*

**U.S. Cl. 279—75** **16 Claims**



1. A tool shaft coupler for drivingly coupling a driving shaft with a mating tool shaft which is effectively engaged with the driving shaft, the driving shaft being rotatable about a substantially longitudinal axis within a driving shaft housing, the coupler comprising

at least one torque transmission surface fixedly coupled to the driving shaft for axially slidingly mating with a mating tool shaft to transmit torque between the mating tool shaft and the driving shaft;

tension transmission spaced apart from said at least one torque transmission surface and comprising at least one tension transmission surface and at least one movable tension-resisting member, said at least one tension-resisting member being reversibly and slidingly movable to a tension-resisting position to couple the driving shaft and a mating tool shaft to reversibly limit maximum axial movement of the mating tool shaft with respect to the driving shaft under an axial tension load;

at least one compression transmission surface fixedly coupled to the driving shaft for substantially limiting maximum axial movement of a mating tool shaft with respect to the driving shaft under an axial compression load;

shaft locking means having an engagement surface and being slidably coupled to the driving shaft for reversibly locking said at least one tension-resisting member in a tension-resisting position; and

guide means for substantially preventing rotation of said shaft locking means with respect to the driving shaft about the longitudinal driving shaft axis.

**5,490,684**

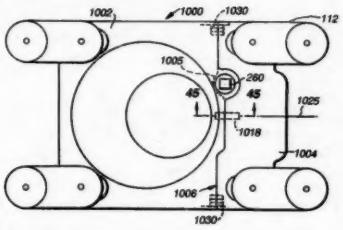
## SPLIT CHASSIS CAMERA PEDESTAL

**Leonard T. Chapman, North Hollywood, Calif., assignor to Leonard Studio Equipment, Inc., North Hollywood, Calif.**

**Continuation-in-part of Ser. No. 97,265, Jul. 23, 1993, which is a continuation-in-part of Ser. No. 761,178, Sep. 16, 1991, abandoned, which is a continuation-in-part of Ser. No. 591,524, Oct. 1, 1990, Pat. No. 5,174,593. This application Sep. 28, 1993, Ser. No. 128,670**

**Int. Cl.[6] B62B** *3/00*

**U.S. Cl. 280—47.11** **12 Claims**




1. A camera pedestal comprising:

a front chassis section;

a rear chassis section;

a journal pivotally connecting the front and rear chassis sections;

a crab steering belt crossing over between the front and rear chassis sections at a location adjacent to the journal;

a pair of spaced apart front legs pivotally attached to the front chassis section;

a pair of spaced apart rear legs pivotally attached to the rear chassis section; and

dampening means for dampening relative pivotal movement between the front and rear chassis sections.

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**5,490,685**

## BABY CARRIAGE

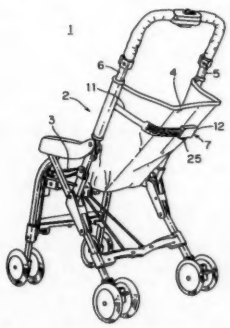
**Tadashi Kitayama, Hyogo, and Ichiro Onishi, Osaka, both of, Japan, assignors to Aprica Kassai Kabushikikaisha, Osaka, Japan**

**Filed Jun. 7, 1994, Ser. No. 255,099**

**Claims priority, application Japan, Jun. 16, 1993, 5-032413 U**

**Int. Cl.[6] B62B** *7/04*

**U.S. Cl. 280—47.38** **19 Claims**




1. A baby carriage comprising:

a seat having a seat portion and a backrest portion upwardly extending from a rear end of said seat portion so that said backrest portion has an angle of inclination that is changeable;

first and second fixed members positioned at two sides of said seat respectively; and

a belt assembly arranged on a back side of said backrest portion in supporting contact with said backrest portion, wherein said belt assembly has a length that is adjustable for changing said angle of inclination of said backrest portion;

wherein said belt assembly includes a first flexible belt having first and second ends wherein said first end is coupled to said first fixed member, a second flexible belt having first and second ends wherein said first end is coupled to said second fixed member, and a buckle coupled to said second end of said first belt wherein said buckle has a belt passage through which said second belt can be passed,

wherein said second belt has a first major surface and longitudinal edges along said surface and a recessed serrated step portion is formed as a recess in said first major surface, and a plurality of engaging cavities are formed in said serrated step portion longitudinally along said second belt between said longitudinal edges,

wherein said buckle includes an operating member movably held in said buckle to extend across said belt passage on said first major surface of said second belt, wherein said operating member is laterally slidable across said second belt, and said buckle further includes a spring arranged to urge said operating member to move in a first direction,

and wherein said operating member has an engaging projection that projects into said recessed serrated step portion and is adapted to move within said serrated step portion to engage with any one of said plurality of engaging cavities upon movement of said operating member under urging of said spring in said first direction, and said operating member further includes a press operating part projecting from said buckle and adapted to be pressed to drive said operating member in a second direction.

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**5,490,686**

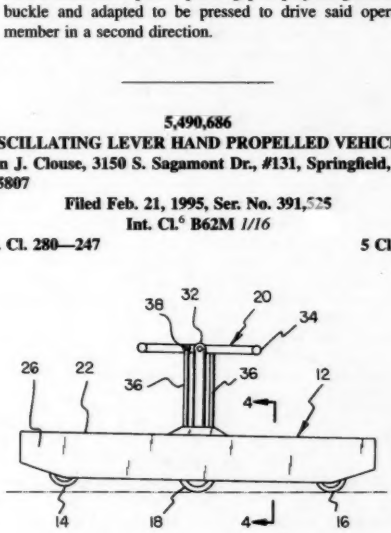
## OSCILLATING LEVER HAND PROPELLED VEHICLE

**Gern J. Clouse, 3150 S. Sagamont Dr., #131, Springfield, Mo. 65807**

**Filed Feb. 21, 1995, Ser. No. 391,525**

**Int. Cl.[6] B62M** *1/16*

**U.S. Cl. 280—247** **5 Claims**




1. An oscillating lever hand propelled vehicle comprising:

a frame having a first pair of drive wheels rotatably mounted thereto about a horizontal axis, and a second pair of drive wheels similarly rotatably mounted to the frame about a horizontal axis extending therethrough;

a pair of center wheels mounted to the frame and positioned between the first and second pair of drive wheels;

a propulsion and steering means mounted to the frame for converting oscillating human motion into rotational torque outputted through the drive wheels and further for converting pivoting human motion into rotation of the center wheels about a vertical axis to steer the vehicle.

**5,490,687**

## WHEELCHAIR, IN PARTICULAR FOR PARAPLEGICS

**Rainer Scholl, Eachenatr 6, 75223 Niefern-Oschelbronn, Germany**

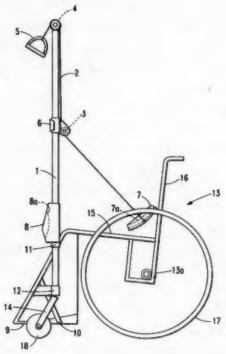
**PCT No. PCT/DE92/00355, § 371 Date Mar. 7, 1994, § 102(e) Date Mar. 7, 1994, PCT Pub. No. WO92/19202, PCT Pub. Date Nov. 12, 1992**

**PCT Filed May 6, 1992, Ser. No. 150,118**

**Claims priority, application Germany, May 6, 1991, 9105574 U; Dec. 13, 1991, 41 41 158.7**

**Int. Cl.[6] A61G** *5/00;5/14*

**U.S. Cl. 280—250.1** **11 Claims**



**1**. A wheelchair comprising a frame with a seating surface, a backrest, a plurality of wheels and a lifting device for lifting a user of the wheelchair from a seating position to a standing position, said lifting device comprising two spars connected to said frame to have a substantially vertical orientation when in use and means for converting a downward force into a lifting force for lifting the user toward the standing position, wherein said means for converting comprise: a seating band positionable to act on the user's body; first and second deflection rollers on each said spar, said first roller being mounted above said second roller; and two lifting cables linked to said seating band and each passing from said seating band, around said second roller on a respective one of said spars, then upwardly to and around said first deflection roller on the respective one of said spars in order to guide said seating band in a manner to cause the lifting force to be directed forwardly and upwardly, and further wherein:

said lifting device is operative for placing the user in the standing position and for supporting the upper part of the user's body when the user is in the standing position.

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**5,490,688**

## CONTROL DEVICE FOR FOLDING AND EXPANDING A BAGGAGE CART

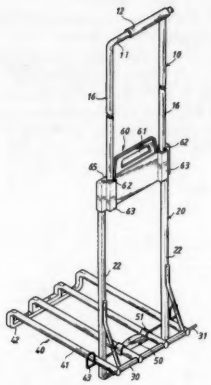
**Chin-Chang Cheng, No. 20, Lane 327, Sec. 2, Chung Shan Rd., Chung Ho City, Taipei Hsien, Taiwan, Prov. of China**

**Filed Oct. 25, 1994, Ser. No. 328,888**

**Int. Cl.[6] B62B** *1/04*

**U.S. Cl. 280—655** **7 Claims**

**1**. A control device for folding and extending a baggage cart which comprises a substantially U-shaped support member (**20**) including a horizontal first bight (**21**) and two parallel vertical legs (**22**) each extending downwardly therefrom, a substantially U-shaped handle portion (**10**) having a horizontal second bight (**11**) and two parallel elongated stands (**16**) each extending downwardly therefrom and each respectively pivotally engaged with a corresponding one of said vertical legs (**22**) of said support member (**20**), a base member (**40**) pivotally engaged with said support member (**20**) at a lower portion of each of said vertical legs (**22**), said control device comprising:



a movable sleeve member (**60**) movably mounted on said pair of elongated stands (**16**) of said handle portion (**10**) and comprising a recessed portion formed by a top plate (**65**) and side walls, a pair of lug portions (**63**) each laterally formed on said movable sleeve member (**60**) and offset from said recessed portion, each having an opening formed in said top plate, and each having a vertical passage (**62**) longitudinally defined therein for receiving a corresponding one of said elongated stands (**16**) of said handle portion (**10**) such that said sleeve member (**60**) is able to move along said elongated stands (**16**) of said handle portion (**10**), said recessed portions and vertical passages having a common opening (**64**) facing downwardly, whereby, said sleeve member (**60**) is able to be moved downwardly along said pair of elongated stands (**16**) of said handle portion (**10**) to a first position where said first bight and an upper portion of each of said pair of vertical legs (**22**) of said support member (**20**) are received within said recessed portion (**64**) of said sleeve member (**60**) with said first bight (**21**) of said support member (**20**) abutting against said top plate (**65**) of said sleeve member (**60**) such that each of said elongated stands (**16**) of said handle portion (**10**) is respectively fixed to a corresponding one of said vertical legs (**22**) of said support member (**20**), thereby fixing said handle portion (**10**) to said support member (**20**), and said sleeve member (**60**) is able to be moved upwardly along said pair of elongated stands (**16**) to a second position where said first bight (**21**) and said vertical legs (**22**) of said support member (**20**) are detached from said recessed portion (**64**) of said sleeve member (**60**) such that said elongated stands (**16**) of said handle portion (**10**) are able to pivot relative to said vertical legs (**22**) of said support member (**20**), thereby folding said handle portion (**10**).

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**5,490,689**

## REACTION CAN TO COVER JOINING METHOD

**Brett R. Garner, South Weber, and Russell P. Lee, Ogden, both of Utah, assignors to Morton International, Inc., Chicago, Ill.**

**Filed Jan. 5, 1995, Ser. No. 369,199**

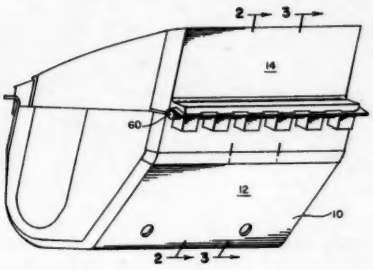
**Int. Cl.[6] B60R** *21/16*

**U.S. Cl. 280—728.2** **3 Claims**

**1**. In a passenger side airbag module assembly consisting of a reaction can and a cover or chute adapted to be installed into an automotive vehicle, the improvement which comprises:

a reaction canister having walls which terminate in an open mouth, said walls including two planar sidewalls and two planar endwalls, said sidewalls extending beyond the extremity of said endwalls, each of said sidewalls being bent to form a flange substantially normal to the planar portions of said sidewalls, thereby defining a flange extending outwardly from the mouth of said canister,

apertures provided in portions of said sidewalls adjacent to the mouth of said canister, a module cover or chute having an




inner end adapted to be installed in a recess in the dashboard of said vehicle and an outer end adapted to be inserted into the mouth of said canister; said cover or chute including two endwalls and two sidewalls,

a web on an exterior surface of each of said sidewalls adjacent to the outer end of said cover/chute and integral with said sidewalls,

blocks integral with said web and depending from said web, said blocks being shaped to be inserted into the apertured in the flanges of said reaction canister, and bores extending transversely through said blocks and a rod inserted through said bores to secure said blocks to said reaction canister,

whereby said cover/chute may be assembled to said reaction canister without the use of screws, rivets, nuts, or welding and whereby the load during deployment of an airbag in said canister is distributed over a wide area defined by said reaction canister flange and said cover/chute web.

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**5,490,690**

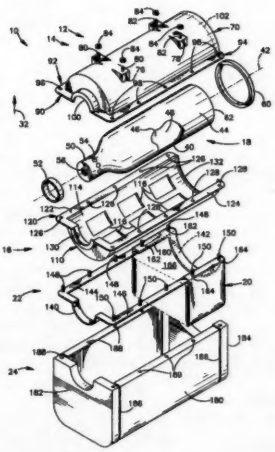
## VEHICLE SAFETY APPARATUS INCLUDING INFLATABLE RESTRAINT

**Joseph J. Mihm, North Branch, Mich., assignor to TRW Vehicle Safety Systems Inc., Lyndhurst, Ohio**

**Continuation-in-part of Ser. No. 64,039, May 14, 1993, which is a continuation-in-part of Ser. No. 780,260, Oct. 21, 1991, abandoned. This application Jul. 1, 1994, Ser. No. 273,461**

**Int. Cl.[6] B60R** *21/16*

**U.S. Cl. 280—728.2** **24 Claims**



**1.** A vehicle safety apparatus comprising:

a housing including a first portion and a second portion which define a first chamber in said housing, at least one of said first and second portions having a series of fastener openings;

said first portion of said housing having first and second opposite end portions and said second portion of said housing having first and second opposite end portions;

an inflator disposed in said first chamber between said first and second portions of said housing, said inflator including a wall defining a second chamber in said inflator, an inflation fluid source disposed in said second chamber in said inflator, said inflator wall having an outer surface extending between first and second opposite end portions of said inflator;

said first end portion of said inflator being clamped with said first end portion of said first housing portion and said first end portion of said second housing portion, said second end portion of said inflator being clamped with said second end portion of said first housing portion and said second end portion of said second housing portion;

an inflatable vehicle occupant restraint having an inflation fluid opening and a series of fastener openings; and

a plurality of fasteners extending through said fastener openings in said at least one portion of said housing and through said fastener openings in said inflatable restraint, said fasteners connecting said first portion of said housing with said second portion of said housing and with said inflatable restraint.

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**5,490,691**

## VEHICLE SAFETY ARRANGEMENT FOR POSITIONING A VEHICLE OCCUPANT

**Ruprecht Sinnhuber, Gifhorn, and Bernd Richter, Bokensdorf, both of, Germany, assignors to Volkswagen AG, Wolfsburg, Germany**

**Continuation-in-part of Ser. No. 42,823, Apr. 5, 1993, abandoned. This application May 23, 1994, Ser. No. 247,262**

**Claims priority, application Germany, Jun. 30, 1992, 42 21 414.9**

**Int. Cl.[6] B60R** *21/22;21/28;21/32*

**U.S. Cl. 280—735** **6 Claims**

**1.** A vehicle safety arrangement for protecting an occupant comprising airbag means arranged to be activated in the event of a collision and connected to a collision sensor arranged to cause full activation of the airbag means, a precollision sensor for detecting an impending collision, and occupant-moving means separate from the airbag means and activatable in response to the precollision sensor prior to full activation of the airbag means for moving the occupant of a vehicle seat into a normal restraint position.

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**5,490,692**

## LABEL/LEAFLETS

**Robin G. Howard, Bury St. Edmunds, United Kingdom, assignor to Denny Bros. Printing Limited, Suffolk, United Kingdom**

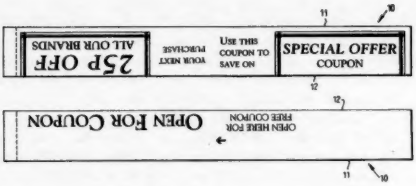
**Filed Sep. 30, 1993, Ser. No. 128,721**

**Claims priority, application United Kingdom, Jan. 1, 1992, 9220720**

**Int. Cl.[6] B42D** *19/00;15/00;1/00*

**U.S. Cl. 283—81** **13 Claims**

**1.** A leaflet comprising: a first sheet having a first fold line extending transversely of the sheet about which fold line the first sheet is folded to provide a cover panel and a rear panel, the cover panel having a surface exposed at a front side of the leaflet, and the




rear panel having a surface exposed at a rear side of the leaflet, said surfaces being located on opposite sides of said first fold line from one another; and a second sheet having a second fold line extending transversely thereof, the second sheet being folded about itself at said second fold line, the folded second sheet being enclosed between the cover and rear panels of the first sheet and with the fold line of the second sheet adjacent the fold line of the first sheet, the two folded sheets being secured together face to face along one edge of the leaflet extending in a direction away from the fold lines.

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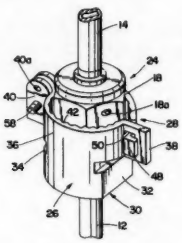
**5,490,693**

## TUBE COUPLING LOCKING DEVICE

**Ronald K. Fisher, Ravenna; Gerald A. Babuder, Mentor, and David L. Doty, Twinsburg, all of Ohio, assignors to Cajon Company, Macedonia, Ohio**

**Filed Sep. 28, 1994, Ser. No. 314,338**
**Int. Cl.[6] F16L** *35/00;15/08*
**U.S. Cl. 285—92** **17 Claims**




**1**. A tube coupling assembly comprising first and second coupling body sections having cylindrical end portions joined by axially interconnected male and female threads and each body section having wrench flats formed in parallel pairs on opposite sides of the respective body section, a releasable locking clamp to prevent undesired unthreading of the connected first and second body sections, the locking clamp including a first clamp member having a first end with spaced parallel rigid arms engaged with the wrench flats on opposite sides of the first body section and a second end of the first clamp having a rigid concave configuration engaged about the second coupling body section, and a second clamp member with a clamping surface of concave configuration engaged about the second coupling body section in opposed relationship to the second end of the first clamp member and joined thereto by connecting means to clamp the locking clamp to the second body section.

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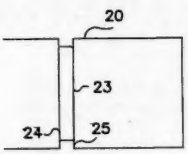
**5,490,694**

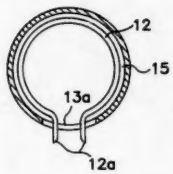
## THREADLESS PIPE COUPLER

**Paul W. Shumway, Avondale, Ariz., assignor to American Fence Corp, Phoenix, Ariz.**

**Filed Mar. 3, 1995, Ser. No. 397,920**
**Int. Cl.[6] F16L** *37/14*
**U.S. Cl. 285—305** **8 Claims**

**1**. A sprinkler system comprising:




a first elongated pipe, said first elongated pipe comprising a first end portion adjacent a first end of said first pipe, said first end portion having a single first circumferential groove on the external surface of said first pipe, said first groove being spaced apart from first end of said first elongated pipe by a predetermined distance;

a second elongated pipe, said second elongated pipe comprising a first end portion adjacent a first end of said second pipe, said first end portion having a single first circumferential groove on the external surface of said second pipe, said second pipe first groove being spaced apart from said first end of said second pipe section by said predetermined distance;

a pipe coupler for receiving and joining said first and said second elongated pipe sections, said pipe coupler comprising:

a single piece cylindrical sleeve, said sleeve comprising first and second end portions, said first end portion receiving said first end of said first elongated pipe and said second end portion receiving said first end of said second elongated pipe, said first end portion having first and second interior circumferential grooves on the interior surface of said sleeve, said second end portion having first and second interior circumferential grooves on said interior surface, said first end portion first circumferential groove being spaced apart from the end of said first end portion by a predetermined distance, said second end portion first circumferential groove being spaced apart from the end of said second end portion by said predetermined distance, said first end portion second circumferential groove being spaced apart from said first end portion end by a second predetermined distance, said second end portion second circumferential groove being spaced apart from said second end portion end by said second predetermined distance, said first and second end portion first circumferential grooves each having both sidewalls extending substantially perpendicular to said interior surface of said coupler; said coupler further comprising:

a lock ring retained and carried in said first end portion first circumferential groove, a second lock ring carried in said sleeve second end portion first circumferential groove, a first seal ring carried in said sleeve first end portion second circumferential groove, a second seal ring carried in said sleeve second end portion second circumferential groove,

said first lock ring being movable from a relaxed state to permit insertion of said first,pipe end portion into said sleeve first end portion, said first lock ring engaging said first pipe first circumferential groove to limit all axial movement of said first pipe relative to said sleeve, and said first seal ring sealingly engages said first pipe external surface, said second lock ring being movable from a relaxed state to permit insertion of said second pipe end portion into said sleeve second end portion, said second lock ring having a relaxed state such that when said second lock ring engages said second pipe first groove said second lock ring limits all axial movement of said second pipe relative to said sleeve, and said second seal ring sealingly engages said second pipe external surface; said first and second lock rings each being irremovable from said coupler while each respective said first and second pipe is inserted in said coupler, and wherein

said sleeve first end portion first groove comprises a first aperture extending through said sleeve, and said first lock ring comprises first and second arms extending

outward through said first aperture, said first and second arm being movable to urge said lock ring from said relaxed state into engagement with the bottom surface of said first end portion first groove whereby said first pipe first end may be inserted into said sleeve past said first lock ring.

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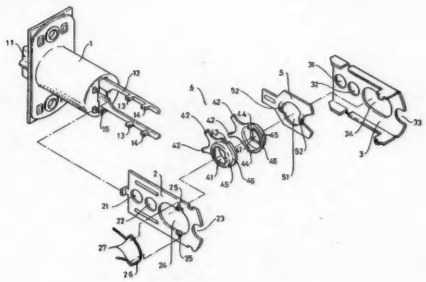
**5,490,695**

## DEAD BOLT ASSEMBLY FOR TUBULAR DOOR LOCKS

**Jiang-Lin Shiue, Kaohsiung Hsien, Taiwan, Prov. of China, assignor to Taiwan Fu Hsing Industrial Co., Ltd., Kaohsiung Hsien, Taiwan, Prov. of China**

**Filed Aug. 17, 1994, Ser. No. 291,465**
**Int. Cl.[6] E05C** *1/00*
**U.S. Cl. 292—1.5** **3 Claims**



1. A dead bolt assembly comprising:

a lock case,

a dead bolt slidably received in said lock case and including a pair of extensions extended outward beyond said lock case, each of said extensions including a pair of protrusions extended therefrom,

a pair of plates fixed to said lock case and each including an oblong hole formed therein, each of said oblong holes including two end portions,

an actuating wheel slidably engaged in said oblong holes of said plates and slidable between said end portions of said oblong holes and slidable between said extensions of said dead bolt, said actuating wheel including a pair of teeth for engaging with said protrusions of said extensions when said actuating wheel is rotated, and

a board disposed between said plates and including an orifice formed therein for engaging with said actuating wheel, said board including bulge means for engaging with said actuating wheel and for forcing said actuating wheel toward one of said plates so as to retain said actuating wheel in place.

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**5,490,696**

## DOOR LOCKING SYSTEM

**Ozzie B. Hutson, Spartanburg, S.C., assignor to Fortruss, Inc., Greenville, S.C.**

**Continuation-in-part of Ser. No. 978,139, Nov. 18, 1992, Pat. No. 5,253,905. This application Oct. 18, 1993, Ser. No. 138,420**
**Int. Cl.[6] E05B** *65/10*
**U.S. Cl. 292—92** **17 Claims**

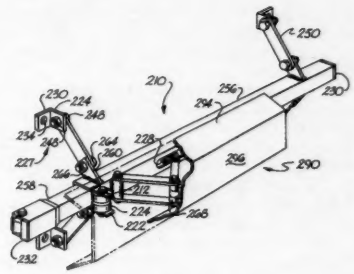
1. A door locking device for attachment to a door, the door being held within a door frame having first and second outer frame surfaces adjacent the door and spaced on opposite sides of the door from one another, the door being hinged proximate the second frame surface for swinging outwardly away from the door frame, the door locking device comprising:

a mounting structure for attachment to the door;

a support structure connected to said mounting structure; said support structure including a stationary extension portion extending over and spaced in front of said second outer frame surface when the door is closed;

at least one restraining member connected to said support structure and movable from an restraining position extending over and spaced in front of the first outer frame surface, for restraining the door from outward movement from the door frame, to a retracted position, for allowing the door to move outwardly from the door frame; and

a retraction structure movable from a first position to a second position; said retraction structure being connected to said at least one restraining member for selectively causing said restraining member to be maintained in said restraining position when said retraction structure is in said first position, such that upon a force being delivered to said retraction structure in a direction towards the door, said retraction structure moves to said second position and causes said at least one restraining member to move from said restraining position to said retracted position, thereby allowing the door to swing outwardly from the door frame.



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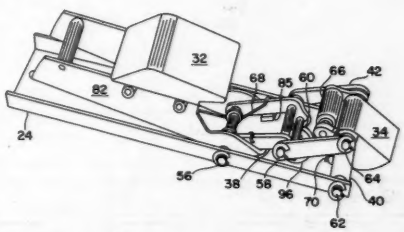
**5,490,697**

## ACCESS CONTROL ASSEMBLY

**Walter E. Surko, Jr., Southington, Conn., assignor to International Security Products, Inc., Southington, Conn.**

**Filed Apr. 12, 1994, Ser. No. 226,682**
**Int. Cl.[6] E05B** *65/10*
**U.S. Cl. 292—92** **20 Claims**



1. A lock assembly for a door, a door with which the lock assembly is to be associated being supported from a frame and having first and second oppositely disposed surfaces, said lock assembly comprising:

handle means, said handle means being adapted for mounting on a first surface of a door;

key operated lock means, said lock means including a drive member movable in response to key operation;

strike means, said strike means being adapted for mounting on the frame of a door on which said handle means is mounted;

a bolt;

means pivotally supporting said bolt from the second surface of the door, said bolt supporting means positioning said bolt for cooperation with said strike means, said bolt supporting means including:

bolt enabling means, said enabling means comprising linkage means, said linkage means having a rigid state and a collapsible state, said bolt being pivotally mounted on said linkage means;

means for resiliently biasing said bolt in a first direction of rotation whereby said bolt will be extended and will engage said strike means to lock the door;

first control means coupled to said linkage means for selectively causing said linkage means to be configured in the rigid or collapsible state without imparting motion to said bolt whereby the application of force to said bolt when said first control means has caused said linkage means to be configured in the collapsible state will permit said linkage means to collapse and said bolt to retract and disengage said strike means;

second control means coupled to said linkage means for selectively causing said linkage means to be configured in the rigid or collapsible state without imparting motion to said bolt; and

manual actuator means for causing operation of said second control means; and

means for connecting said lock means drive member to said first control means whereby said lock means may control the state of said linkage means.

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**5,490,698**

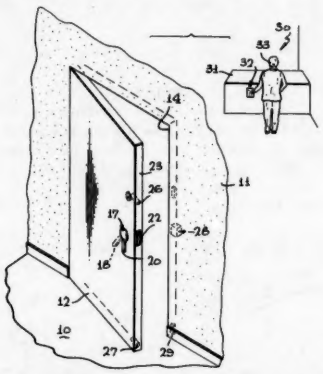
## DOOR LOCKING SYSTEM

**Paul M. Dezso, 16018 Hartland St., Van Nuys, Calif. 91406**

**Filed Jul. 5, 1994, Ser. No. 270,269**

**Int. Cl.[6] E05C** *1/06*

**U.S. Cl. 292—138** **9 Claims**




1. An automatic door locking system that provides for unlocking of the door to a room from a remote location, the system comprising:

a door lock comprising:

a door locking bolt movably mounted in the door;

a door lock striker mounted in the frame of the door positioned to receive said locking bolt when said door is in the closed position, said door lock striker in a first condition when the door is locked and in a second condition when said door is unlocked;

a first lever mounted on the room side of door manually operable to move said locking bolt out of engagement with said door lock striker when said door lock striker is in said first position; and

a second lever mounted on the opposite side of the door, said second lever inoperable to disengage said door locking bolt from said door lock striker when said door lock striker is in said first position and disengages said locking bort from said door lock striker when the door is in the closed position and said door lock striker is in said second condition;

an electrical circuit means to unlock said door lock from the remote location by placing said door lock striker in said second condition such that the door can be opened by said second lever and, when the door is opened, automatically resets the door lock to the locked condition; and

power supply means coupled to said electrical circuit means.

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**5,490,699**

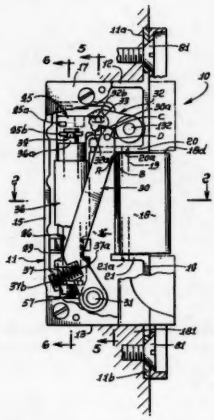
## ELECTRIC STRIKE FOR FAIL SAFE OR FAIL SECURE OPERATION

**Alan K. Uyeda, Pico Rivera, Calif., assignor to Adams Rite Manufacturing Company, Industry, Calif.**

**Continuation of Ser. No. 93,473, Jul. 19, 1993, abandoned. This application May 2, 1994, Ser. No. 236,047**

**Int. Cl.[6] E05B** *15/02*

**U.S. Cl. 292—341.16** **10 Claims**



1. In an electrical release door strike, the combination comprising:

a ) a carrier frame,

b) a strike bolt carried by the frame for movement when released, allowing door opening, the bolt adapted to receive and resist door opening force prior to bolt movement,

c) a solenoid carried by the frame to have either of two alternate positions relative to the frame,

d) and means operatively connected between the solenoid and the bolt in either of said positions for causing the bolt to assume

i) a fail safe condition allowing bolt pivoting when the solenoid is in one of said positions,

ii) a fail secure condition preventing bolt pivoting when the solenoid is in the other of said positions.

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**5,490,700**

## SHEET METAL U.L. SCREW

**Martin Zuckerman, Villa Park, Calif., assignor to Emhart Inc., Newark, Del.**

**Filed Aug. 3, 1994, Ser. No. 283,462**

**Int. Cl.[6] E05B** *3/00*

**U.S. Cl. 292—357** **4 Claims**

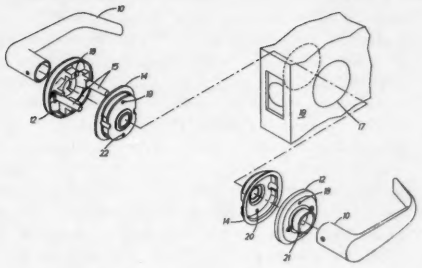
1. A tubular lock assembly which is to be located within a suitable thru bore in a door comprising:

a pair of rose liner assemblies each including

a rose liner

a steel collar selectively sized to effectively close the thru bore of the door, and

means for securing said collar on said rose liner,



fastener means for securing said rose liner assemblies together on either side of the door with said collars effectively closing the door thru bore,

coaxial holes in one of said rose liners and in each of said steel collars and

a self tapping screw extending through said hole in said one rose liner and through said holes in said steel collars,

said steel collar holes being selectively sized so that said self tapping screw will define a screw thread therein during insertion to permanently maintain said steel collars closing the door thru bore.

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**5,490,701**

**PINE CONE RETRIEVER**

**Roger M. Glass, Hilton Head Island, S.C., assignor to Cone Swallow Inc., Hilton Head Island, S.C.**

**Filed Jul. 10, 1995, Ser. No. 500,180**

**Int. Cl.[6] A01B** *1/00;* **A01D** *11/00*

**U.S. Cl. 294—61** **6 Claims**

1. A tool for retrieving pine cones comprising:

an elongated handle,

a support plate extending transversely of a lower end of said handle,

a plurality of three elongated, flexible tines having upper ends affixed to said support plate at unequally spaced apart, triangularly oriented locations and arranged to extend downwardly from said support plate with individual tines converging along their length such that the separations between adjacent sides at the lower ends of each of the respective pairs of adjacent tines comprising the three-tine array are unequal distances correlative to straddling dimensions of pine cone varieties.

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**5,490,702**

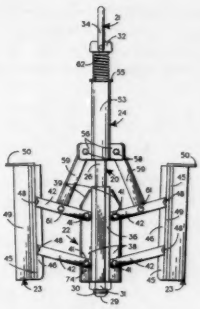
**FASTENING TOOL FOR ENGAGING IN A CHANNEL OF A CONCRETE BLOCK**

**Thomas E. Fleming, 1144 - 16th Ave., Clarkston, Wash. 99403**

**Filed Jan. 24, 1995, Ser. No. 377,354**

**Int. Cl.[6] B66C** *1/54*

**U.S. Cl. 294—97** **8 Claims**



1. A gripping tool providing fastening means for lifting an object by releasably fastening within a channel defined in the object, comprising in combination:

an elongate body rod carrying lifting means at an upper end and fixedly carrying in a lower portion

two radially extending fastening fins with an obtuse central angle less than 180 degrees therebetween, said fastening fins each pivotally carrying a pair of similar vertically spaced fastening arm connector links;

similar movable fastening arms pivotally carried by each pair of fastening arm connector links, each said fastening arm having an outer body with an outer surface to contact a channel defining object surface and means for supporting the fastening arm on the channel defining object and preventing passage through the object channel; and

release mechanism including a release collar slidably carried on the body rod between the fastening fins and the lifting means, said release collar having radially extending fastening ears arrayed in the same angular relationship as the fastening fins carried by the body rod, each said fastening ear pivotally carrying a release connector link communicating with an associated fastening arm to move that fastening arm responsive to motion of the release collar.

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**5,490,703**

**PATIENT TRANSPORT SYSTEM**

**Barry J. Hewko, Sidney, Canada, assignor to Vancouver Island Helicopters Ltd., Sidney, Canada**

**Filed Jun. 4, 1993, Ser. No. 72,569**

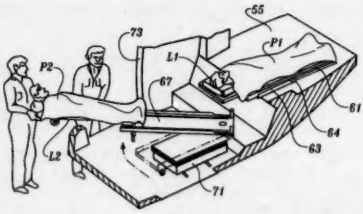
**Int. Cl.[6] A61G** *3/00;* **B64C** *1/22*

**U.S. Cl. 296—19** **4 Claims**

1. An apparatus for positioning and securing a patient support relative to an interior of a vehicle having a floor comprising;

a first tray for removably receiving the patient support wherein the patient support can be secured to said first tray for transportation of the patient; and

a first base on the floor of the vehicle, said first tray being removably, telescopically connected to said first base such that said first tray can be telescopically, longitudinally extended relative to said first base, said first tray being pivotally attached to said first base for pivotal movement of said first tray, said first base including means for vertically lifting




and lowering said first tray relative to the floor, wherein said first base includes a foundation member and a second tray, said second tray being located between said first tray and said foundation member such that said first tray and said second tray are removably, telescopically connected whereby said first tray can be telescopically, longitudinally extended relative to said second tray, and wherein upon telescopic, longitudinal extension of said first tray relative to said second tray, said first tray is removable from said second tray and is securable in said vehicle at a location remote from said second tray and said first base for sequential loading of more than one patient support.

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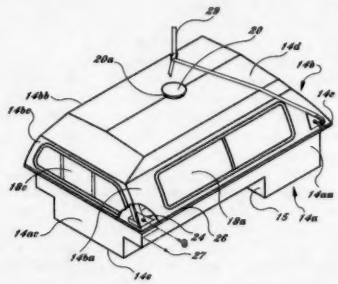
**5,490,704**

## SURVEILLANCE CAMPER TOP

**Thomas Calnan, 11210 NW. 43rd Ct., Coral Springs, Fla. 33065**

**Filed Sep. 21, 1993, Ser. No. 124,949**
**Int. Cl.[6] B60P** *3/00*
**U.S. Cl. 296—24.1** **19 Claims**




**1**. A surveillance camper enclosure to be inserted into a conventional truck bed of a truck having a cab and a bed said enclosure comprising:

(a) a modular enclosure having a driver side sidewall, a passenger side sidewall, a cab side sidewall and a tailgate side sidewall, said sidewalls forming corners, said sidewalls terminated at the upper end by a roof enclosure panel and terminated at the lower end by a floor enclosure panel to define a sealed internal volume, said lower end defining a well adapted for insertion into a truck bed, said upper end protruding from the truck bed;

(b) means for hoisting the enclosure from the truck bed to another truck bed, said hoisting means comprising:

a plurality of steel plates individually attached proximal to each of said corners between the upper end and the lower end, a plurality of female threaded ports defined by said steel plates, a plurality of male threaded eye bolts threadably mated from outside the enclosure individually with each of said female threaded ports so that said eye bolts define a free unobstructed end, said eye bolts having an opening in said free end for receiving cables used in hoisting such that said enclosure may be lifted from the truck bed and placed in another truck bed;

(c) a plurality of viewing windows individually mounted in openings defined by each of said sidewalls; and

(d) means for concealing the internal volume from outside view while allowing viewing of the outside from the internal volume, said means for concealing operatively associated with said plurality of viewing windows, said means for concealing including a plurality of slidable barriers individually disposed adjacent each of said plurality of viewing windows inside the internal volume, wherein one of said plurality of slidable barriers and one of said plurality of viewing windows is aligned with the cab for providing an opening for ingress and egress between the cab and said internal volume and for concealing said internal volume, each of said plurality of slidable barriers comprising at least two opaque panels slidably mounted between two tracks, said tracks attached to said side walls in the internal volume, said tracks allowing each of said at least two opaque panels to define a viewing port.

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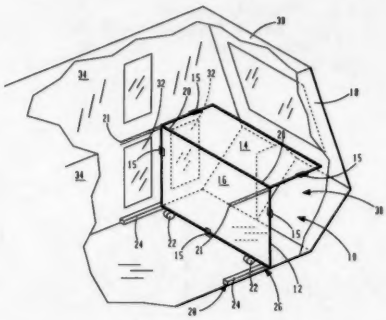
**5,490,705**

## APPARATUS FOR CONFIGURING MULTIPLE COMPARTMENTS

**Christopher P. Barr, 3008 Northtown Pl., Midland, Tex. 79705**

**Filed Jul. 26, 1994, Ser. No. 280,735**
**Int. Cl.[6] B60P** *3/04;* **B62D** *33/04*
**U.S. Cl. 296—24.2** **12 Claims**




**1**. In a horse trailer having a floor, two side walls and a roof, apparatus for selectively configuring the trailer to define a tacking compartment or a privacy compartment for a horseman, comprising:

a wall slidably disposed substantially perpendicular to the side walls, capable of being selectively secured in a forward and rearward position;

said wall having upper and lower portions divided by a laterally extending hinge, the upper portion being pivotable about the lower portion;

said wall providing clearance for the head and neck of the horse and defining a tacking compartment when disposed in said forward position and when the upper portion thereof is disposed in a substantially horizontal position; and

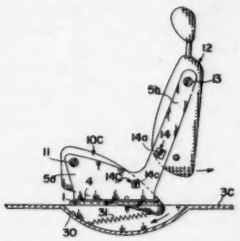
said wall defining a privacy compartment to provide substantially complete privacy to an adult horseman from the rear of the trailer when said wall is disposed in said rearward position and the upper portion is disposed in a substantially vertical position.

**5,490,706**

## SAFETY SYSTEM FOR OCCUPANT OF AN AUTOMOTIVE VEHICLE

**Hideo Totani, 1092-5 Hagiwara Hagiwara-cho, Mashita-gun Gifu-ken, Japan**

**Filed Mar. 22, 1995, Ser. No. 408,242**
**Int. Cl.[6] B60N** *2/42*
**U.S. Cl. 296—68.1** **2 Claims**




1. A safety system for an occupant of an automotive vehicle, said safety system comprising: oppositely disposed seat risers secured on a floor surface of the automotive vehicle; left and right oppositely disposed seat supports provided on left and right sides through slide locks adapted to engage with the seat risers and disengage therefrom; a recess formed in the floor surface between the left and right supports; a seat including a cushion positioned between said left and right seat supports above the recess, a front portion of said seat cushion is pivotably supported by a pair of cushion shafts and a back side portion of said seat cushion is locked in place by oppositely disposed lock members of a first lock mechanism; a seat back having upper sides thereof rotatably supported by the left and right supports via a pair of back shafts and the lower sides of said seat back locked in place by oppositely disposed lock pins of a second lock mechanism; and a Central Processing Unit for releasing, in a moment, said lock pins of the second lock mechanism and the lock members of the first lock mechanism on the basis of a detection signal from a collision detector at a time of a collision of the automotive vehicle whereby a bottom of the seat back swings free and a back of the seat cushion falls into the recess.

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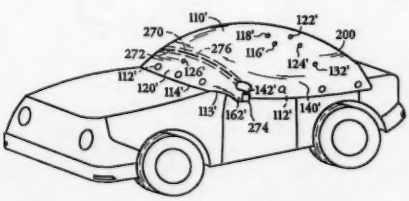
**5,490,707**

## EXTERIOR AUTOMOBILE SUNSHIELD

**Jose R. De La Cruz, 460 Lakeshire Dr., Daly City, Calif. 94015**

**Filed May 17, 1995, Ser. No. 443,364**
**Int. Cl.[6] B60J** *11/00*
**U.S. Cl. 296—95.1** **5 Claims**




1. An exterior automobile sunshield comprising::

a) a flexible breathable material having (1) a predetermined shape, (2) a perimeter along the predetermined shape (3) a windshield portion adapted for covering a windshield of an automobile wherein the windshield portion has a perimeter and one section defining an aperture having a diameter of approximately ⅜ inch, in which the windshield portion aperture is positioned at least 10 inches from the sunshield perimeter, (4) a rear portion adapted for covering a rear window of the automobile wherein the rear portion has a perimeter and one section defining an aperture having a diameter of approximate ⅜ inch, in which the rear portion aperture is positioned at least 10 inches from the sunshield perimeter, (5) a first side portion adapted for covering one or more windows of a first side of the automobile wherein the first side portion has a perimeter and one section defining an aperture having a diameter of approximately ⅜ inch, in which the first side portion aperture is positioned at least 10 inches from the sunshield perimeter, (6) a second side portion adapted for covering one or more windows of a second side of the automobile wherein the second side portion has a perimeter and one section defining an aperture having a diameter of approximately ⅜ inch, in which the second side portion aperture is positioned at least 10 inches from the sunshield perimeter, (7) a roof portion adapted for covering a roof of the automobile wherein the roof portion has four sections each defining an aperture having a diameter of approximately ⅜ inch, in which the four apertures are positioned within a circular area having a diameter of approximately 30 inches and having a center which is approximately equidistant from the windshield portion perimeter, the rear portion perimeter, the first side portion perimeter and the second side portion perimeter, (8) a first side portion perimeter section adapted for fitting a first automobile outside mirror therein, (9) a second side portion perimeter section adapted for fitting a second automobile outside mirror therein, (10) an inside surface for contacting the automobile and (11) an outside surface for exposure to sunlight;

b) a first elastic strap attached to the first outside mirror perimeter section, wherein the first elastic strap is adapted for attaching to the first outside mirror;

second elastic strap attached to the second outside mirror perimeter section wherein the second elastic strap is adapted for attaching to the second outside mirror;

d) six or more suction cups fastened to the sunshield in close proximity to the sunshield perimeter, each suction cup having a diameter ranging from about 2 inches to about 3 inches, wherein the suction cups are spaced approximately equidistant from each other;

e) a sleeve attached to the inside surface of the sunshield wherein the sleeve has (1) a first open end which is positioned at the first side portion perimeter section which is adapted for fitting the first automobile outside mirror therein, (2) a second open end positioned at the second side portion perimeter, (3) a midpoint approximately equidistant between the first open end and the second open end, wherein tile midpoint is spaced at least 6 inches from the sunshield perimeter and (4) a predetermined inside diameter;

f) a security band selected from the group consisting of flexible metal bands, metal wires, metal chains and metal cables, having a first end and a second end wherein the security band is slidably positioned inside the sleeve such that the band first end and the band second end protrude from the sleeve, in which the security band is adapted for locking the sunshield to the automobile; and

g) a padlock for locking the security band onto the automobile.

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**5,490,708**

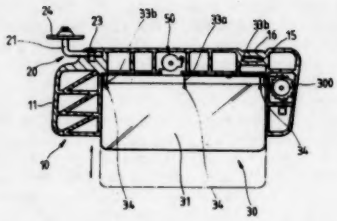
## MULTIPURPOSE AUTOMOBILE SUNVISOR

**Jong D. Lee, 2/3, 55 Bon-dong, Tongjak-gu, Seoul 156-060, Rep. of Korea**

**PCT No. PCT/KR93/00091, § 371 Date Jun. 8, 1994, § 102(e) Date Jun. 8, 1994, PCT Pub. No. WO/9408812, PCT Pub. Date Apr. 28, 1994**
**PCT Filed Oct. 8, 1993, Ser. No. 244,640**
**Claims priority, application Rep. of Korea, Jan. 8, 1992, 92-18505**
**Int. Cl.[6] B60J** *3/02*
**U.S. Cl. 296—97.8** **8 Claims**

1. A multipurpose automobile sunvisor comprising:

a main body (**10**) which is roughly rectangular and comprised of a pair of panel members (**11**) and (**12**);



a bent supporting bar (**21**) one of which is rotatably engaged with an upper portion of said main body (**10**) and the other end of which is secured onto the automobile's chassis:

a socket portion (**24**) engaging with the other end of said bent supporting bar (**21**);

a light-shading portion (**30**) having a light-shading screen (**31**) tinted for screening the direct rays of light, and a receiving slot (**13**) built in said main body (**10**) for receiving thereinto said light-shading screen (**31**); and

light-shading screen raising means (**300**) for pulling said light-shading screen (**31**) of said light-shading portion (**30**) into said receiving slot (**13**) of said main body (**10**); wherein,

said light-shading screen raising means (**300**) includes:

a first drum assembly (**36**) having drum members (**36***a*) and **36**(*b*) and a coil spring (**36***c*), said drum member (**36***a*) being wound with draw strings (**33***a*) and (**33***b*) around its circumference and said coil spring installed within said first drum assembly;

a first sprocket (**37**) combined with said drum member (**36***b*) and having a plurality of sawteeth which has a greater slope on one side than the other;

a latch (**38***b*) interlocked with said sawteeth of said first sprocket (**37**);

a plate spring (**38***a*) for elastically biasing said latch (**38***b*) towards said sprocket (**37**) for the engagement therebetween, one end of which is engaged with a predetermined portion of said pair of panel members (**11**) and (**12**) and the other end of which contacts a portion of said latch (**38***b*); and

a lock-releasing button (**39**) for pushing said latch (**38***b*) so as to detach said latch (**38***b*) from said first sprocket (**37**).

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**5,490,709**

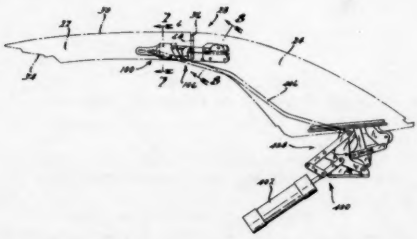
**HINGE FOR A FOLDING ROOF IN A CONVERTIBLE AUTOMOTIVE VEHICLE**

**Brian Rahn, St. Clair Shores, Mich., assignor to ASC Incorporated, Southgate, Mich.**

**Filed Dec. 7, 1993, Ser. No. 163,374**

**Int. Cl.**[6] **B60J** *7/12*

**U.S. Cl. 296—122** **46 Claims**



1. A hinge for a folding roof structure used in an automotive vehicle, said folding roof structure having a front roof section and a rear roof section, said hinge comprising:

a first member affixed to said front roof section;

a second member affixed to said rear roof section;

a linkage mechanism coupling said first member to said second member adjacent thereto, said linkage mechanism providing separation between said front roof section and said rear roof section during arcuate relative displacement of said sections;

said linkage mechanism including:

a first L-shaped link being defined by a first elongated arm and a first shortened arm, said first elongated arm having a first pivot portion at an end and having a second pivot portion proximate to an intersection between said first elongated arm and said first shortened arm, said first shortened arm having a pivot portion rotatably coupled to said first member;

a second L-shaped link having a second elongated arm and a second shortened arm, said second elongated arm having a first pivot portion at an end and having a second pivot portion proximate to an intersection between said second elongated arm and said second shortened arm, said second shortened arm having a pivot portion at an end rotatably coupled to said second member, said first L-shaped link rotatably coupled to said second L-shaped link at said second pivot portion of each of said first and second elongated arms;

a first intermediate link having a first pivot rotatably coupled to said first member, said first intermediate link further having a second pivot rotatably coupled with said first pivot portion of said first elongated arm of said first L-shaped link; and

a second intermediate link having a third pivot rotatably coupled with said second member, said second intermediate link further having a fourth pivot rotatably coupled with said first pivot portion of said second elongated arm of said second L-shaped link.

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**5,490,710**

**SWING ARM CHAIR**

**Mary K. Dearing, 806 Kennedy Rd., Braidwood, Ill. 60408-1845, and Rose A. Robb, 107 W. 32nd St., Farmington, N.M. 87401**

**Filed Aug. 1, 1994, Ser. No. 283,809**

**Int. Cl.**[6] **A47B** *39/00;83/02*

**U.S. Cl. 297—162** **1 Claim**

1. A swing arm chair comprising:

a) a chair for supporting a person in a seated position, said chair comprising a padded backrest a swivel cushioned seat, a pedestal column extending downwardly from the center of said seat, and a base for supporting said pedestal column in an upright position;

b) a pair of armrests on the sides of said chair;

c) a flat, generally rectangular writing tablet having an enlarged area at one end thereof, said enlarged area having an elongated, recessed mouse pad to accommodate a wireless mouse;

d) means comprising an elongated C-shaped clamp attached to said arm rest for mounting a first end of said writing tablet to one said armrest, said first end being at the end having said enlarged area, said C-shaped clamp being attached to said arm rest using a pair of set screws;

e) said C-shaped clamp including means at the first end of said writing tablet, for pivoting said writing tablet longitudinally about a first axis, so that said writing tablet can go from a horizontal work position over said chair, to a vertical fold down storage position next to said armrest; and

f) swivel assembly means at the first end of said writing tablet for permitting said writing tablet to rotate 360 degrees in a horizontal plane to allow the person to exit and enter said chair.

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**5,490,711**

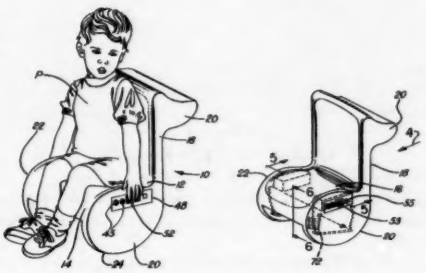
**MUSICAL ROCKING CHAIR**

**Alexander Pollock, 16179 Bentler Ave., Detroit, Mich. 48219**

**Filed Dec. 19, 1994, Ser. No. 358,874**

**Int. Cl.[6] A47C** *31/00;7/72;* **A63H** *5/00*

**U.S. Cl. 297—186** **20 Claims**



**1.** A musical rocking chair comprising:

a body support having a base provided with a seat, a pair of sidewalls and a back projecting upwardly from said seat, the sidewalls of said base being spaced apart to provide a cavity within said body support which is located beneath said seat, said sidewalls of said base having ground engaging curved surfaces to permit said body support to rock back and forth when manipulated by a person occupying said seat, said sidewalls having openings therein communicating with said cavity;

a concertina musical instrument located within said cavity, said instrument including a pair of separate keyboard operated music boxes, support means mounting said music boxes within said cavity along said sidewalls, one of said keyboard music boxes having a first keyboard having a plurality of keys with speakers and mounted within the opening in one of said sidewalls, the other of said keyboard music boxes having a second keyboard provided with a plurality of keys with speakers and mounted within the opening in the other of said sidewalls;

said concertina musical instrument including an expandable bellows located within said cavity for providing compressed air and directing the air to said music boxes, a movable bellows actuating plate located in said base and engageable with the ground, said actuating plate having one end pivotally carried by said sidewalls, means connecting said bellows to said plate, said plate being adapted to be responsive to the rocking of said body support by a person occupying said seat to compress or expand said bellows and to thereby direct air to said music boxes to produce musical tones as heard through the speakers under the control of said keys operable by the person occupying said seat.

**5,490,712**

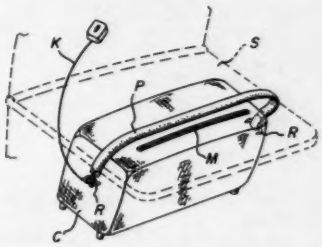
**STORAGE OF ITEMS**

**Teresa M. Drelick, 7 Nelson Ave., Methuen, Mass. 01844**

**Continuation-in-part of Ser. No. 495,147, Mar. 19, 1990, abandoned. This application May 28, 1991, Ser. No. 707,288**

**Int. Cl.[6] A47C** *7/62*

**U.S. Cl. 297—188.12** **6 Claims**



**1.** The method of temporarily storing items below a fixed position support having a lower surface spaced from an upper surface, which comprises the steps of:

(a) providing a container for the storage of the items; and

(b) strapping said container to said support below said lower surface by a strap that is narrower than said container and both the outward and transverse lengths of said support from its fixed position, and extends over said upper surface at an angle with respect to the outwardly extending length of said support;

further including the method for temporarily storing items with a reminder that the items have been temporarily stored, wherein the support comprises a seat having upper and lower surfaces and extending outwardly above a floor from a back and the container comprises an elongated storage bag having an upper surface containing a reclosable opening and a strap extendable along said reclosable opening, and said container is placed below said seat with the direction of elongation of said container transverse to the direction of the outward extension of said seat and said container is strapped to said seat by extending said strap over said seat above said reclosable opening facing the lower surface of said seat, comprising the steps of;

(c) elevating said container above said floor with said reclosable opening facing the lower surface of said seat;

thereby to reduce the incidence of contamination of said container by dirt and debris on said floor and further provide increased security against the unauthorized opening of said reclosable opening while said items are stored therein, and

(d) positioning a retractable cord on an occupant for said seat and extending said cord to said container;

thereby to provide a reminder to said occupant of said seat that said items are in temporary storage below said seat when said occupant decides to leave the vicinity of said seat, by a pull exerted against the occupant by said cord.

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**5,490,713**

**APPARATUS FOR VIBRATING SEATS**

**Masahiro Fukuoka, Aichi, Japan, assignor to Fukuoka Kagaku Ltd., Aichi, Japan**

**Division of Ser. No. 194,356, Feb. 10, 1994, which is a continuation-in-part of Ser. No. 987,481, Dec. 4, 1992, Pat. No. 5,348,370. This application Dec. 19, 1994, Ser. No. 358,379**

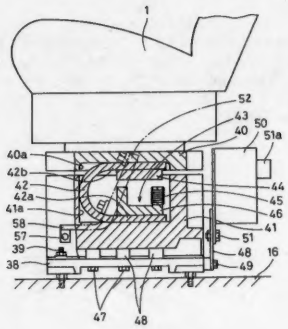
**Int. Cl.[6] A47C** *31/00*

**U.S. Cl. 297—217.3** **1 Claim**

**1.** An apparatus for vibrating a seat comprising:

a driver's seat;

means for vibrating said driver's seat; and




means for controlling the vibration of said means for vibrating the driver's seat,

wherein means for vibrating said driver's seat includes a lower vibrating body, an upper vibrating body on said lower vibrating body, said driver's seat being on said upper vibrating body, a U-shaped flat spring connected at one end thereof to said lower vibrating body and at another end thereof to said upper vibrating body, an electro-magnet installed on one of said ends of said flat spring, a magnet on the other of said ends of said spring and facing said electro-magnet, and controller means for controlling the energizing of said electro-magnet.

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**5,490,714**

**METAL CRIB STRUCTURE FOR A ROCKING CHAIR SEATING PLANE**

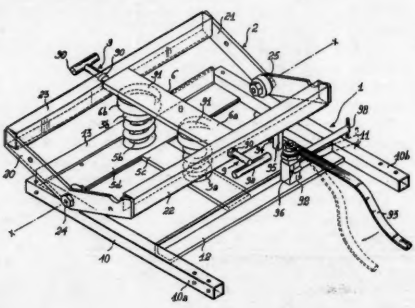
**Alberto de Santis, Santeramo in Colle, Italy, assignor to Industrie Natuzzi S.p.A., Bari, Italy**

**Filed Aug. 8, 1994, Ser. No. 286,244**

**Claims priority, application Italy, Jan. 13, 1993, RM93U0183**

**Int. Cl.[6] A47C** *3/02; A47D 13/10*

**U.S. Cl. 297—267.1** **3 Claims**




1. An improved metal crib structure for a seating plane of an armchair, comprising:

a fixed frame, constituted by two opposite lateral elements, and a first front element and a first back element, each of which lateral elements having an upwardly-projecting bearing with through holes on a horizontal axis for receiving pivoting bolts;

a cradle-shaped seat support frame of the seating plane, oscillating about the horizontal axis, comprising two opposite v-shaped lateral elements and a second front element and a second back element which are both straight and welded to free ends of the v-shaped lateral elements, the v-shaped lateral elements being respectively rotatably and pivotally engaged to each said upwardly-projecting seat by pivoting bolts engaged in said through holes;

two helix springs for opposing oscillation of the seat support frame mounted between the fixed frame and the seat support frame;

a stiffening device for the helix springs, comprising, for each of the helix springs, means for adjustably blocking a top coil thereof in a trunconical seating on the seat support frame, a bottom coil thereof being blocked in a trunconical seating on the fixed frame wherein the means for adjustably blocking the top coil of each of the helix springs comprises:

a lockscrew having a T-shaped positioning head and coupling with nuts associated with each said second front element and said second back element of the seat support frame, the lockscrew being situated in proximity to each helix spring of said two helix springs and passing through the second front element and second back element; a circular cap welded to and below each trunconical seating on the seat support frame for respectively constraining and end of said each helix spring, the circular cap being provided with a through hole and a threaded coupling for engaging the nuts; and

manual lock means for blocking the seat support frame in a horizontal position.

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**5,490,715**

**ARRANGEMENT IN A CHAIR**

**Peter Opsvik, Pilestredet 27 H, N-0164 Oslo, Norway**

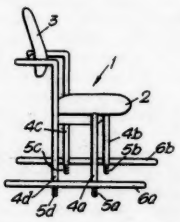
**PCT No. PCT/NO92/00012, § 371 Date Jun. 21, 1993, § 102(e) Date Jun. 21, 1993, PCT Pub. No. WO92/12653, PCT Pub. Date Aug. 6, 1992**

**PCT Filed Jan. 20, 1992, Ser. No. 81,335**

**Claims priority, application Norway, Jan. 21, 1991, 910232**

**Int. Cl.[6] A47C** *3/02*

**U.S. Cl. 297—310** **6 Claims**




1. A chair for resting on a floor comprising:

a seat for a user,

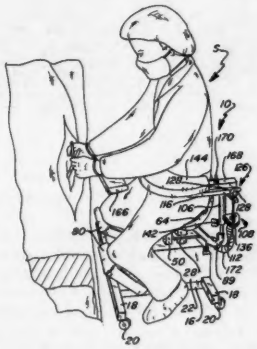
means for supporting said seat relative to the floor, said supporting means comprising at least one resilient element located between the seat and the floor to provide movement of the chair and the seat thereof in up and down, vertical, forward and rearward and sidewards directions and combinations thereof,

at least one supporting rod attached to said supporting means below said seat and extending along a respective side of said seat and beyond the front and rear of the seat, each end of each said at least one rod establishing a stop for the forward and rearward tilting of the chair on said at least one resilient element.

## 5,490,716
## SURGEON'S CHAIR

**Michael L. Naughton, 2876 S. Wheeling Way, Aurora, Colo. 80014**

**Filed Jul. 25, 1994, Ser. No. 279,406**
**Int. Cl.[6] A47C** *7/50*
**U.S. Cl. 297—423.12** **20 Claims**



1. A surgeon's chair for providing bodily support to a surgeon during a surgical process, said chair comprising:

a frame assembly;

an adjustable seat assembly attached to said frame assembly;

a dual pivoting support having a lower rotational section attached to said frame assembly, said lower rotational section having a free rotating end rotatable about a first vertical axis, and an upper rotational section attached to said free rotating end, said upper rotational section being rotatable with a vertically aligned support member about a second vertical axis laterally spaced from said first vertical axis;

a releasable locking device attached to said dual pivoting support between said upper and lower rotational sections, said releasable locking device being engageable at a location outside a periphery of said vertically aligned support member and remote from said second vertical axis enabling said upper rotational section to be adjustably locked in a desired radial position; and

at least one pad attached to said upper rotational section to provide bodily support for the torso and arms of the surgeon.

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## 5,490,717
## LOTUS SEAT

**James W. Greene, 853 Broadway, Suite 1516, New York, N.Y. 10003**

**Filed Aug. 12, 1994, Ser. No. 289,903**
**Int. Cl.[6] A47C** *7/00*
**U.S. Cl. 297—452.41** **9 Claims**

1. A seating device for relaxation of lumbar region muscles and for reducing stress on knee joints of a user when seated in a lotus position, comprising:

means for accommodating the pelvis and thighs of said user and having a front and a rear;

concave seat means formed in said accommodating means, having a first surface upwardly slanting toward the rear and a second surface, shorter than said first surface, upwardly slanted toward the front, for producing a forward tilt to the pelvis of said user when seated thereon;

a forwardly tilting, upwardly narrowing, rear support member formed above said first surface on said accommodating means at the rear, the uppermost end of the rear support member being located forwardly of the lowermost end thereof; and

a rearwardly tilted, upwardly narrowing front post member, smaller than said rear support member, formed at the end of said second surface on said accommodating means at the front.

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## 5,490,718
## SEAT CUSHION STRUCTURE FOR USE IN A FRONT SEAT

**Kenichiro Akizuki; Hiroharu Suenaga, both of Toyota, and Masaki Hayashi, Aichi, all of, Japan, assignors to Toyota Jidosha Kabushiki Kaisha, and Araco Kabushiki Kaisha, both of Toyota, Japan**

**Continuation of Ser. No. 995,201, Dec. 22, 1992, abandoned. This application Mar. 1, 1995, Ser. No. 396,862**
**Claims priority, application Japan, Dec. 26, 1991, 3-345075; Mar. 17, 1992, 4-060692**
**Int. Cl.[6] A47C** *7/02*
**U.S. Cl. 297—452.49** **37 Claims**

1. A seat cushion structure for use in a vehicle front seat, comprising:

a cushion portion, on which an occupant sits;

a supporting panel constructed and arranged to have a curved surface forming a supporting surface for an occupant seated on said cushion portion, said supporting panel being overlaid with said cushion portion such that said supporting panel and said cushion portion are assembled together;

a supporting member, which extends around the outer-lower periphery of said cushion portion so as to support said supporting panel;

a first connecting means including a first torsion spring which is movable relative to said supporting panel, which elastically connects said supporting panel and said supporting member in the vicinity of a front edge portion of said supporting panel;

a pair of second connecting means being swingably supported at a rear portion of said supporting member to pivot respectively about a fulcrum, and pivotably connecting said supporting member and said supporting panel, wherein a first end portion of said second connecting means is pivotally connected to a corresponding side portion of said supporting panel, and a second end portion of said second connecting means being subjected to an urging force in a tension direction; and

urging means disposed between said second end portion of said second connecting means and said supporting member to urge said second end portion of said second connecting means in the tension direction, said urging means being constructed and arranged to exhibit a linear spring characteristic.

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**5,490,719**

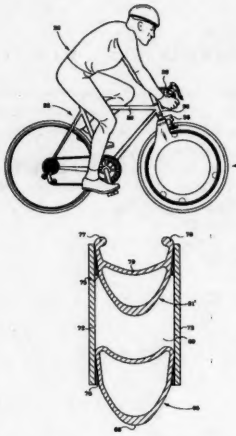
**RACING WHEEL**

**Paul E. Lew, Indianapolis, Ind., assignor to Wear and Tear, Inc., Indianapolis, Ind.**

**Continuation-in-part of Ser. No. 169,582, Dec. 17, 1993, Pat. No. 5,419,619. This application Jul. 18, 1994, Ser. No. 276,258**

**Int. Cl.[6] B60B** *21/00*

**U.S. Cl. 301—5.1** **11 Claims**



1. A wheel for a bicycle movable in a forward direction over a horizontal support surface, the wheel comprising:

a rotationally stationary inner component connectable to the bicycle;

a rotatable outer hoop comprising a bearing engaging surface and an axis of rolling rotation, wherein said outer hoop is concentric with said inner component;

a ground engaging tread disposed on said outer hoop;

a first bearing mounted on said inner component to be rotationally stationary therewith, said first bearing being operationally positioned around said inner component at an angular location between about 10° and 23° rearward of a vertical line passing through said axis of rolling rotation;

a second bearing mounted on said inner component to be rotationally stationary therewith, said second bearing being operationally positioned around said inner component at an angular location between about 100° and 130° forward of said first bearing;

a third bearing mounted on said inner component to be rotationally stationary therewith, said third bearing being operationally positioned around said inner component at an angular location between about 105° and 135° rearward of said first bearing; and

a fourth bearing mounted on said inner component to be rotationally stationary therewith, said fourth bearing being operationally positioned around said inner component at an angular location within an obtuse angle between said second bearing, said axis of rolling rotation, and said third bearing.

**5,490,720**

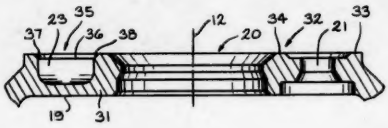
**VEHICLE WHEEL HAVING A TINNERMAN NUT CLEARANCE GROOVE**

**Kenneth R. Archibald, Canton, Mich., assignor to Hayes Wheels International, Inc., Romulus, Mich.**

**Filed Jan. 27, 1994, Ser. No. 187,944**

**Int. Cl.[6] B60B** *3/16*

**U.S. Cl. 301—35.62** **19 Claims**




1. A vehicle wheel including:

a wheel rim adapted for carrying a tire, said rim defining a wheel axis;

a wheel disk extending across said rim, said disk including a center hub, said hub having mounting surfaces formed perpendicular to said wheel axis, said mounting surfaces being adapted to abut a vehicle suspension component;

an annular recess formed between said hub mounting surfaces concentric with said wheel axis, said recess forming uninterrupted annular edges with said mounting surfaces; and

a plurality of stud holes adapted for attaching the wheel to a vehicle extending through said hub, said stud holes being parallel to said wheel axis and equally circumferentially spaced about a circle disposed within said recess.

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**5,490,721**

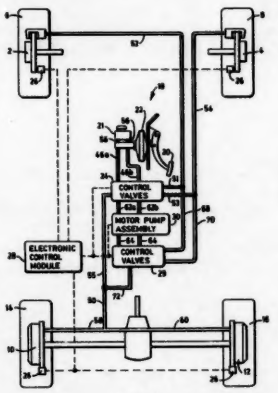
**ANTI-LOCK BRAKE SYSTEM WITH MOTOR AND GEAR PUMP ASSEMBLY**

**Robert J. Bartell, Owasso, and Calvin V. Kern, Lansing, both of Mich., assignors to Eaton Tennessee, Inc., Eaton Rapids, Mich.**

**Filed Nov. 22, 1994, Ser. No. 343,772**

**Int. Cl.[6] B60T** *8/32*

**U.S. Cl. 303—116.4** **4 Claims**




1. An anti-lock brake system for wheeled vehicles, said system comprising:

a brake for each wheel of said vehicle;

a first control valve manifold in fluid communication with a manual brake actuator and adapted to be in communication with each of said brakes;

a second control valve manifold adapted to receive fluid from said first control valve manifold and adapted to be in fluid communication with said brakes;

an electronic control module in electrical communication with said control valve manifolds;

a speed sensor adjacent each of said wheels and adapted to sense a change of speed of said adjacent wheel and communicate said change of speed to said control module; and

a motor and pump assembly in electrical communication with said control module for conveying brake fluid from said first control valve manifold to said second control valve manifold;

said motor and pump assembly comprising

an electric motor, and

one gear pump adapted to receive brake fluid from said first control valve manifold and transmit said brake fluid to said second control valve manifold.

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**5,490,722**

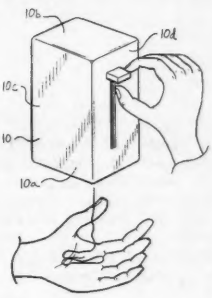
**HANDS FREE DENTAL FLOSS DISPENSER**

**Gary J. Sonnett; Frederick V. Sprouse, both of Frisco; David L. Hector, Englewood; Robert G. Lowry, Englewood, and Bradley M. Woodworth, Englewood, all of Colo., assignors to Sprouse and Sonnett, Inc., Frisco, Colo.**

**Filed Jul. 14, 1994, Ser. No. 275,114**

**Int. Cl.[6] A47B** *83/00*

**U.S. Cl. 312—237** **18 Claims**




1. Apparatus for dispensing measured lengths of dental floss comprising:

a housing;

a spool disposed inside the housing having a length of dental floss wound thereon;

a dispensing means for engaging a free end of the length of dental floss at a position inside the housing and moving the free end of the length of dental floss a measured distance to a position outside the housing where the free end of the length of dental floss may be grasped by a user; and

a cutting means for severing the length of dental floss after the dispensing means has moved the free end of the length of dental floss the measured distance.

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**5,490,723**

**DISK ARRAY SUBSYSTEM FOR USE IN A DATA PROCESSING SYSTEM**

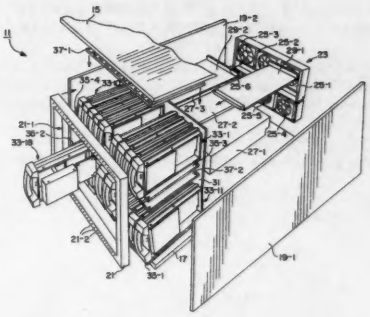
**Edward K. Driscoll, Westwood; Arthur R. Nigro, Hopkinton, both of Mass., and Thomas D. Fillio, Newton, N.H., assignors to Data General Corporation, Westboro, Mass.**

**Division of Ser. No. 80,310, Jun. 24, 1993, Pat. No. 5,343,357, which is a division of Ser. No. 935,110, Aug. 26, 1992, Pat. No. 5,247,427. This application Feb. 3, 1994, Ser. No. 191,039**

**Int. Cl.[6] A47B** *88/00*

**U.S. Cl. 312—334.28** **8 Claims**

1. A frame for holding a disk drive and a regulator card, said frame comprising an elongated, generally rectangular, unitary structure shaped to include a front wall, a bottom wall, a top wall, and a side wall, said bottom wall including a longitudinally extending T-bar, said longitudinally extending T-bar including a detent, said top wall including a longitudinally extending fin, said side wall being shaped to include a plurality of snaps for use in mounting said regulator card thereon, each of said snaps being a bifurcated squeezable snap having a tab for limiting movement of the regulator card relative to said wall.



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**5,490,724**

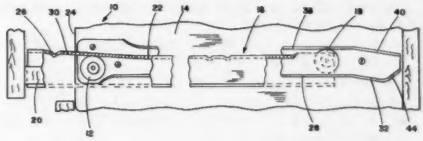
**DRAWER GUIDE FOR SUPPORTING A MOVEABLE STRUCTURE SUCH AS A DRAWER IN A FURNITURE ARTICLE**

**Georg Domenig, Kernersville, N.C., assignor to Grass America, Inc., Kernersville, N.C.**

**Filed Oct. 21, 1994, Ser. No. 327,034**

**Int. Cl.[6] A47B** *88/10*

**U.S. Cl. 312—334.45** **10 Claims**



1. Drawer guide for supporting a moveable structure such as a drawer in a furniture article comprising:

a guide rail having front and rear ends and mountable to a furniture article in a horizontally disposed position of the guide rail, the guide rail having a guide rail roller rotatably mounted;

a pull-out rail having front and rear ends for carrying the moveable structure in a horizontally disposed position of the pull-out rail, the pull-out rail having a pull-out rail upper ledge in rolling contact with the guide rail roller enabling movement of the pull-out rail and carried structure between forward and rearward positions relative to the guide rail, the pull-out rail having a pull-out rail retaining member engaging the guide rail roller in the rearward position of the pull-out rail resisting forward movement of the pull-out rail relative to the guide rail, the pull-out rail upper ledge including a bend spaced from the pull-out rail front end and having an obliquely disposed pull-out rail upper ledge roll-in slope extending from the bend toward the pull-out rail front end in an upwardly inclined direction, the pull-out rail retaining member being formed in said pull-out rail upper ledge roll-in slope as a downwardly extending protrusion spaced between the bend and the pull-out rail front end, and the pull-out rail retaining member engaging the guide rail roller in the rearward position of the pull-out rail with the guide rail roller disposed between the pull-out rail retaining member and the pull-out rail front end.

## 5,490,725
## MELT-SEALING DEVICE FOR EXTRUDERS FOR THE PROCESSING OF THERMOPLASTIC POLYMERS OR RUBBER

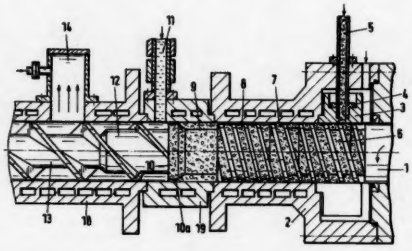
**Friedrich-Otto Behrens, Garbsen; Ulrich Proössler, Uetze, and Jürgen Voigt, Wathlingen, all of, Germany, assignors to Hermann Berstorff Maschinenbau GmbH, Hannover, Germany**

**Filed Sep. 28, 1994, Ser. No. 313,870**

**Claims priority, application Germany, Sep. 30, 1993, 43 33 233.1**

**Int. Cl.[6] B28C *7/04*; B29B *7/42***

**U.S. Cl. 366—76.9** **4 Claims**



1. A melt-sealing device for extruders for the processing of thermoplastic polymer or rubber for sealing off a gear unit side of a conveying screw against high melt pressures within an extrusion chamber defined by the screw and an extruder housing, wherein the conveying screw has a screw configuration which comprises the melt-sealing device and which includes:

an intake section for receiving material pellets and conveying said pellets in a conveying direction toward an extrusion outlet, said intake section being formed with an intake liner with a feed opening for pellets, said feed opening being provided with an insulating sleeve to prevent agglomeration of the pellets,

a compression section having a screw channel depth that decreases in the conveying direction,

a metering section with a constant screw channel depth,

a smooth annular melt channel section devoid of screw channels and having a channel depth and a minimum length of half the diameter of the screw, and

a blister element downstream of said annular melt channel section in the conveying direction, said blister element having a peripheral surface which defines with said extruder housing an annular gap through which the melt passes.

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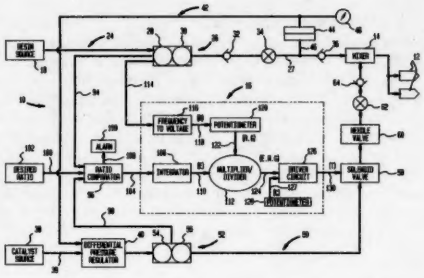
## 5,490,726
## APPARATUS FOR PROPORTIONING TWO COMPONENTS TO FORM A MIXTURE

**Dennis Davis, Bay Village; Harold D. Beam, Oberlin, and Jeffrey J. Kruke, Lorain, all of Ohio, assignors to Nordson Corporation, Westlake, Ohio**

**Filed Dec. 30, 1992, Ser. No. 999,284**

**Int. Cl.[6] G05D *11/02*; B01F *15/04***

**U.S. Cl. 366—152.1** **6 Claims**



1. Apparatus for controlling the relative proportion of a first component and a second component within a mixture, comprising:

a mixer within which the first and second components are combined to form a mixture;

a first-supply which transmits the first component at a first pressure and a first flow rate to said mixer, said first supply producing a flow rate signal representative of said first flow rate;

a pressure sensing device operative to sense said first pressure at which the first component is transmitted to said mixer, and to produce a pressure signal representative of said first pressure;

a second supply which transmits a flow of the second component at a second flow rate to said mixer, said second supply including a pressure adjustment device which is effective to adjust the pressure of the second component supplied to said mixer in response to receipt of said pressure signal from said pressure sensing device;

a valve device, connected between said second supply and said mixer, for turning on and off the flow of the second component to said mixer in accordance with a timed duty cycle;

a controller operative to control the operation of said valve device in response to receipt of said flow rate signal from said first supply.

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## 5,490,727
## DISC-SHAPED MIXING TOOL WITH CONICALLY BEVELED THROUGH BONES

**Günter Pöschl, Schwaikheim, Germany, assignor to PPV-Verwaltungs-AG, Zurich, Switzerland**

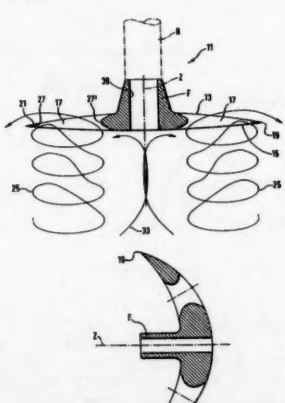
**PCT No. PCT/EP93/01850, § 371 Date Jan. 13, 1995, § 102(e) Date Jan. 13, 1995, PCT Pub. No. WO94/02239, PCT Pub. Date Feb. 3, 1994**

**PCT Filed Jul. 14, 1993, Ser. No. 373,318**

**Claims priority, application Germany, Jul. 16, 1992, 42 23 434.4**

**Int. Cl.[6] B01F *7/26***

**U.S. Cl. 366—316** **10 Claims**



1. A disc-shaped mixing tool (**11**) having an upper side (**13**) and a lower side (**15**), being rotatable around a central axis (**Z**) and having several axial through bores (**17**), with at least one of the two sides (**13**, **15**) of the disc being convex, characterized in that the peripheral edge (**19**) of the disc is knife-sharp, and wherein each bore (**17**) has an upper side (**13**) and a lower side (**15**), each

bore (17) being conically bevelled to form bevels at the upper side (13) and at the lower side thereof (15), so that airfoil profiles are formed between the bores (17) and the peripheral edge (19) in a radial direction and between adjacent bores (17) in a peripheral direction.

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**5,490,728**

## NON-CONTACT OPTICAL TECHNIQUES FOR MEASURING SURFACE CONDITIONS

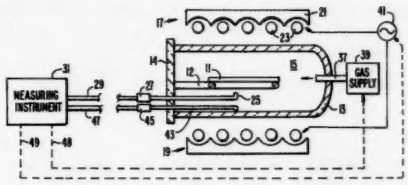
**Charles W. Schietinger, and Bruce E. Adams, both of Portland, Oreg., assignors to Luxtron Corporation, Santa Clara, Calif.**

**Division of Ser. No. 999,278, Dec. 28, 1992, Pat. No. 5,310,260, which is a continuation-in-part of Ser. No. 943,927, Sep. 11, 1992, Pat. No. 5,318,362, which is a continuation of Ser. No. 507,605, Apr. 10, 1990, Pat. No. 5,154,512, said Ser. No. 943,927is a continuation-in-part of Ser. No. 692,578, Apr. 29, 1991, Pat. No. 5,166,080. This application Jan. 12, 1994, Ser. No. 180,641**

**The portion of the term of this patent subsequent to Oct. 13, 2009, has been disclaimed.**

**Int. Cl.[6] G01B** *11/06;* **G01J** *5/06;* **H01L** *21/66*

**U.S. Cl. 374—7** **56 Claims**




1. A method of determining a characteristic of a layer of one material on a surface of another material, comprising the steps of:

directing continuous electromagnetic radiation toward the layer and surface in a manner to be modified thereby, said radiation including a given wavelength range and having a d.c. intensity level with a periodic a.c. intensity ripple superimposed thereon,

detecting a combined level of the intensity within the given wavelength range of the directed electromagnetic radiation after being modified by the layer and the intensity of electromagnetic radiation within said wavelength range that is emitted by the layer and surface to thereby generate a first electrical signal having a first d.c. component with a periodic a.c. intensity ripple component of a first magnitude superimposed thereon,

generating a second electrical signal corresponding to the directed electromagnetic radiation, said 'second electrical signal having a second d.c. component with a periodic a.c. ripple component of a second magnitude superimposed thereon, and

determining the characteristic of the layer from at least the first and second magnitudes of the ripple components of the respective first and second electrical signals.

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**5,490,729**

## BALL SPLINE

**Toyohisa Ishihara, Seki, Japan, assignor to Nippon Thompson Co., Ltd., Tokyo, Japan**

**Filed May 30, 1995, Ser. No. 451,657**

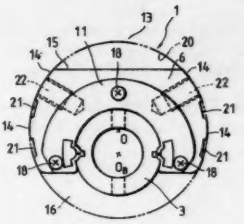
**Claims priority, application Japan, Jul. 12, 1994, 6-181978**

**Int. Cl.[6] F16C** *29/06*

**U.S. Cl. 384—43** **8 Claims**

1. A ball spline comprising,

a ball spline shaft of circular cross-section provided with a pair of first raceway grooves extending longitudinally in the outer surface of the ball spline,



a casing fitted on said ball spline shaft and provided with second raceway grooves extending longitudinally in the inner surface of said casing in such a way as to be opposed to said first raceway grooves, and return bores spaced from said second raceway grooves,

rolling elements rolling between said first and second raceway grooves,

retainers retaining said rolling elements in cooperation with said casing.

end caps which have direction change passages communicating with said second raceway grooves and said return bores, and which are provided on both ends of said casing,

side seals provided on end surfaces of said end caps,

a slider which slides on and relatively to said ball spline shaft and comprises said casing, said rolling elements, said retainers, said end caps and said side seals,

said casing being provided therein with an opening extending over the full longitudinal length so that said casing saddles said ball spline shaft, and

the outer surface of said casing which is on the opposite side of said opening being provided with a pro-working reference plane which is used when said second raceway grooves are formed.

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**5,490,730**

## SLIDE BEARING ASSEMBLY

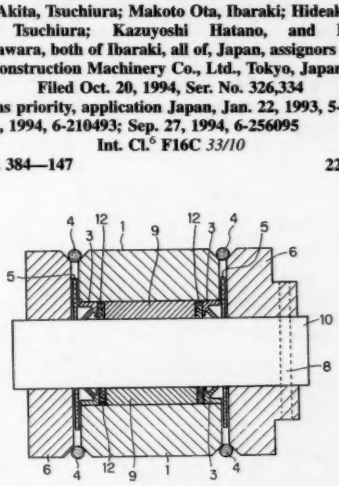
**Hideki Akita, Tsuchiura; Makoto Ota, Ibaraki; Hideaki Nakatani, Tsuchiura; Kazuyoshi Hatano, and Manabu Ogasawara, both of Ibaraki, all of, Japan, assignors to Hitachi Construction Machinery Co., Ltd., Tokyo, Japan**

**Filed Oct. 20, 1994, Ser. No. 326,334**

**Claims priority, application Japan, Jan. 22, 1993, 5-287527; Aug. 11, 1994, 6-210493; Sep. 27, 1994, 6-256095**

**Int. Cl.[6] F16C** *33/10*

**U.S. Cl. 384—147** **22 Claims**



1. In a slide bearing assembly comprising at least a shaft and a bush that is formed of a porous iron-base sintered material, the improvement wherein said bush is impregnated with a lubricant oil having a viscosity in the range from 240 to 1500 cSt.

**5,490,731**

**SLEEVE BEARING WITH INTEGRATED LIP SEAL**

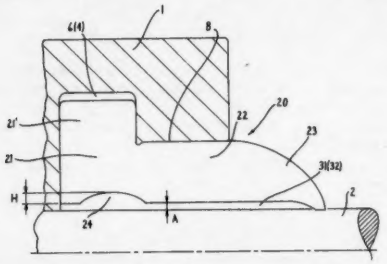
**Michael Scharf, Dietenheim, and Gert Schneider, Langenau, both of, Germany, assignors to Wieland-Werke AG, Ulm, Germany**

**Filed Jan. 12, 1995, Ser. No. 371,812**

**Claims priority, application Germany, Jan. 20, 1994, 44 01 526.7**

**Int. Cl.[6] F16C** *33/74*

**U.S. Cl. 384—147** **14 Claims**




1. A sleeve bearing with inner recesses, which each are arranged in its front areas, and in which is fastened by means of a holding part a lip seal rotating in a peripheral direction, which lip seal rests with a pretensioned sealing lip projecting over the front surface linearly on an associated sliding partner shaft, with an annular cavity having an annular thickness A being formed between the holding part and the shaft, wherein the holding part is force-lockingly received into an annular groove of the recess, wherein between the holding part and the sealing lip there is provided a support part also spaced from the shaft, and wherein the sealing lip is attached to the support part outside of the front surface.

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**5,490,732**

**WHEEL BEARING HUB WITH DEFORMED BEAD**

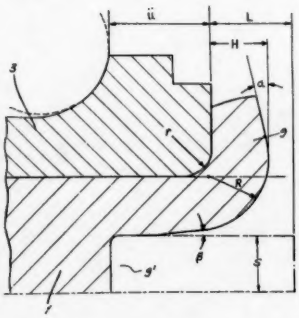
**Henrich Hofmann, Schweinfurt; Roland Langer, Schwanfeld, and Vasilis Hassiotis, Niederwerrn, all of, Germany, assignors to FAG Kugelfischer Georg Schafer AG, Germany**

**Filed Nov. 10, 1994, Ser. No. 337,957**

**Claims priority, application Germany, Nov. 23, 1993, 43 39 847.2**

**Int. Cl.[6] F16C** *33/60*

**U.S. Cl. 384—537** **8 Claims**




1. A wheel bearing unit comprising:

a wheel hub having an axial end;

an angular antifriction bearing around the hub including at least one inner ring on the hub, at least one row of bearing rolling elements around the inner ring, and an outer ring outside the inner ring;

the inner ring being installable on the hub by being movable axially onto the end of the hub, and the inner ring having an axially outer end;

the hub including a tubular end portion extending axially beyond the axially outer end of the inner ring, and the hub end portion being deformed plastically to extend radially outwardly for defining a bead over the axially outer end of the inner ring to clamp the installed inner ring on the hub;

the hub bore being at an angle of inclination (β) in the range of 0° to 20° with reference to the radially inner edge of the inner ring;

at least the portion of the hub defining the bead having a hardness in the range of 200 to 270 HB;

the inner ring of the bearing having an axially outer, radially inner rounded edge around which the bead is formed and the radius (r) of that edge of the inner ring is in the range of 2–4 mm;

the bead being deformed around the radially inner, axially outer edge of the inner ring, the bead has a bead curvature radius (R) in the range of 5–8 mm;

at the radially inner, axially outer edge of the inner ring, the bead has an axial height (H) in the range of 4.0–6.0 mm and wherein radially outwardly, the bead tapers narrower and has an axially outer side that is inclined and an angle (α) in the range of 20°–30° from the radial direction of the axially outer edge of the inner ring.

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**5,490,733**

**RECORDING APPARATUS AND METHOD OF INK SHEET TYPE DETERMINATION**

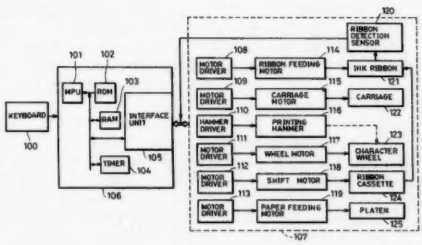
**Shinya Asano, Tokyo, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan**

**Continuation of Ser. No. 99,392, Jul. 30, 1993, abandoned, which is a continuation of Ser. No. 689,518, Apr. 23, 1991, abandoned. This application Sep. 27, 1994, Ser. No. 313,395**

**Claims priority, application Japan, Apr. 24, 1990, 2-106602**

**Int. Cl.[6] B41J** *33/14*

**U.S. Cl. 400—223** **18 Claims**




1. A recording apparatus for performing recording by transferring ink on an ink :sheet onto a recording medium, comprising:

discriminating means for discriminating the type of ink sheet performing a predetermined movement for recording in vertical and horizontal directions with respect to the longitudinal direction of the surface thereof;

recording means for performing recording by transferring the ink on the ink sheet onto the recording medium;

a shift motor coupled to an ink sheet supporting member, wherein activation of said shift motor moves the ink sheet supporting member vertically with respect to said recording means, thereby moving the ink sheet vertically with respect to said recording means;

an ink sheet feed motor, coupled to a taking up mechanism taking up the ink sheet, wherein activation of said ink sheet feed motor causes the taking up mechanism to move the ink sheet horizontally with respect to said recording means; and

programmed automatic control means for automatically controlling said shift motor to move the ink sheet vertically with respect to said recording means in accordance with selected data relating to the type of ink sheet discriminated by said discriminating means and for automatically controlling said ink sheet feed motor to move the ink sheet horizontally with respect to said recording means in accordance with selected data relating to the type of the ink sheet discriminated by said discriminating means.

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**5,490,734**

## METHOD OF CONTROLLING A CARRIAGE AND A PAPER FEED IN A PRINTER

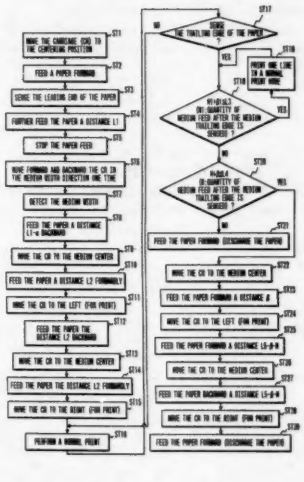
**Norihiro Maruyama, and Takao Mimura, both of Nagano, Japan, assignors to Seiko Epson Corporation, Tokyo, Japan**

**Filed Aug. 1, 1994, Ser. No. 283,876**

**Claims priority, application Japan, Aug. 10, 1993, 5-218098**

**Int. Cl.[6] B41J** *11/42*

**U.S. Cl. 400—582** **20 Claims**



1. A method of controlling a print head and a recording medium feed in a printer, the recording medium having a leading edge between first and second corners and first and second sides, comprising the steps of:

moving a print head and a recording medium relatively so that the print head is positioned at a print start position located substantially midway between said first and second corners;

carrying out a print operation from the print start position toward the first side of the recording medium;

moving the print head and the recording medium relatively so that the print head bypasses the corner of the recording medium, and is returned to the print start position; and

carrying out a print operation from the print start position toward the second side edge of the recording medium.

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**5,490,735**

## METHOD OF OPERATING A PRINTER

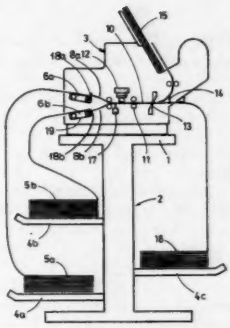
**Klaus Brandenburg, Freudenberg; Klaus-Peter Kluge, Siegen; Kurt-Hermann Richter, Freudenberg, and Wendelin Weber, Siegen, all of, Germany, assignors to PSI Printer Systems International GmbH, Siegen, Germany**

**Filed Dec. 21, 1994, Ser. No. 361,326**

**Claims priority, application Germany, Dec. 22, 1993, 43 43 977.7**

**Int. Cl.[6] B41J** *11/52*

**U.S. Cl. 400—614** **13 Claims**



1. A method of operating a printer having respective stores for a plurality of paper webs to be printed, at least one printer head disposed along a printing path, respective driven in-feed heads between said stores and said path for feeding the respective webs selectively to and along said path and past said printer head, and means downstream of said path for leading said webs away from said path, said method comprising the steps of:

(a) displacing a first paper web from one of said stores with a first of said in-feed heads along said path and past said head to print successive sheets of said first paper web with a given positioning of an imprint relative to a leading edge of the respective sheets;

(b) for changeover of said stores to print sheets of a second of said paper webs, separating a last-printed sheet from said first paper web to produce a leading edge of said first paper web at a setpoint position along said path corresponding to said given positioning of said imprint;

(c) retracting said leading edge of said first paper web from said setpoint position until said leading edge of said web reaches a sensor upstream of said printer head with said first in-feed head and storing in memory by activation of said sensor a displacement difference of said first in-feed head between said setpoint position of said leading edge of said first paper web and a position of said leading edge of said first paper web at said sensor;

(d) thereafter withdrawing said leading edge of said first paper web further to a predetermined parking position; and

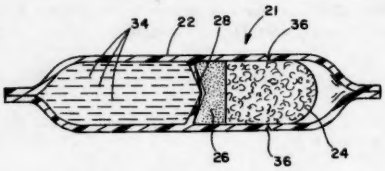
(e) for further printing of said first paper web, advancing said first paper web with said first in-feed head to a desired print position for each sheet thereof corrected based upon the stored displacement difference for said first in-feed head.

**5,490,736**

## STYLUS APPLICATOR FOR A REHYDRATED MULTI-CONSTITUENT MEDICATION

**Terry M. Haber, El Toro; William H. Smedley, Lake Elsinore, and Clark B. Foster, Laguna Niguel, all of Calif., assignors to Habley Medical Technology Corporation, Laguna Hills, Calif.**

**Filed Sep. 8, 1994, Ser. No. 302,586**
**Int. Cl.[6] A61M** *35/00;* **A47L** *13/17*
**U.S. Cl. 401—40** **11 Claims**




7. An applicator for applying a multi-constituent liquid medication to a tissue area in need of treatment, said applicator comprising:

a hollow, flexible body having closed distal and proximal ends;

an absorbent swab retained entirely within said body at the distal end thereof;

a dry medication stored within said body and communicating with said absorbent swab;

a liquid stored within said body at the proximal end thereof;

a defeatable fluid barrier located within said body between said distal and proximal ends to block the introduction of the liquid at the proximal end of said body to the dry medication at said distal end, the proximal end of said body being responsive to a compressive force applied thereto to generate a corresponding hydraulic pressure within said liquid to defeat the fluid blocking integrity of said barrier so that said liquid can be introduced to and mixed with said dry medication to produce a liquid multi-constituent medication, said liquid medication being absorbed by said swab; and

a peripheral tearline formed in the distal end of said body surrounding said absorbent swab so that the distal end of said body can be separated from said proximal end to thereby expose said swab within said body so that said swab can be moved into contact with the tissue area in need of treatment and apply the multi-constituent medication thereto.

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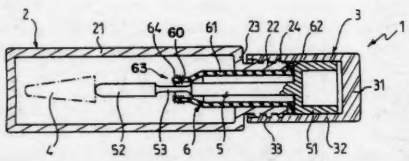
**5,490,737**

## WIPING DEVICE FOR A FLUID PRODUCT APPLICATOR ASSEMBLY

**Jean-Louis H. Gueret, Paris, France, assignor to L'Oreal, Paris, France**

**Filed May 26, 1994, Ser. No. 249,616**
**Claims priority, application France, Jun. 3, 1993, 93 06640**
**Int. Cl.[6] A46B** *11/00;* **A45D** *40/00*
**U.S. Cl. 401—122** **10 Claims**




1. Assembly for applying a fluid product, comprising:

a bottle for containing the fluid product;

a cap fastened on the bottle for closing the bottle;

an applicator arranged at an end of a wand attached to the cap; and

a wiping device equipped with a lip having an opening about which flocking fibers are attached, said wiping device being fastened to the bottle,

wherein, when the cap is fastened on the bottle, the wand passes through the opening in the lip and the applicator is entirely submerged in the fluid product in the bottle and, when the cap is removed from the bottle, the wand passes through the opening and the applicator passes entirely through the wiping device.

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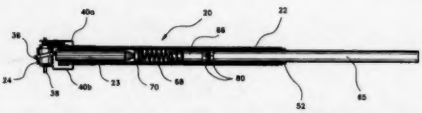
**5,490,738**

## DRAWING IMPLEMENT

**James M. Pearce, 7621 S. Bermuda, Las Vegas, Nev. 89123**

**Filed Oct. 28, 1994, Ser. No. 331,209**
**Int. Cl.[6] B43K** *8/20*
**U.S. Cl. 401—208** **19 Claims**




1. A drawing implement for transferring a drawing material onto a drawing surface comprising:

an elongate tubular housing, having a first end portion and second end portion and a centerline running therethrough, for housing a rod of semi-solid drawing material;

a material transfer wheel mounted adjacent the second end portion of said housing for rotation about an axis running perpendicular to said centerline of said housing for removing drawing material from said rod of drawing material and depositing it on the drawing surface; and

means for rotating said rod of drawing material with respect to said wheel and about an axis parallel to said centerline of said housing.

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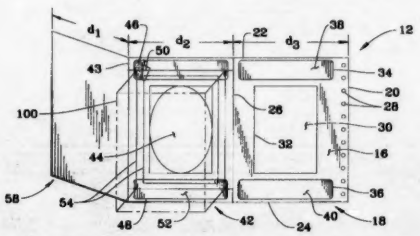
**5,490,739**

## WINDOW DISPLAY PHOTO ALBUM

**Kristin Olson, P.O. Box 127, Barrington, Ill. 60010**

**Filed May 5, 1995, Ser. No. 435,892**
**Int. Cl.[6] B42F** *13/00*
**U.S. Cl. 402—79** **20 Claims**




1. A photo album display sheet for use in securing personal items such as photographs for display through predefined window frames for placement in a photo album comprising: a substantially rectangular single sheet of paper having two side surfaces, said sheet divided into a first framing section defined by a first side edge, an upper edge, a lower edge and a first fold line of said sheet with at least one aperture disposed therethrough; means for coupling items of display for viewing through said aperture of said first framing section; a second framing section further defined by said upper edge, said lower edge, said first and a second fold line with at least one aperture disposed therethrough; means for coupling items of display for viewing through said aperture of said

first framing section; a backing section further defined by a second side edge, said upper edge, said lower edge and said second fold line; means for coupling said backing sheet to said first framing section; and a means for securing said photo album sheet into a booklet having a plurality of similarly sized photo album sheets;

whereby items of display are positioned for viewing through said apertures and secured thereto, said backing section is then available to be folded at said second fold line wherein said means for coupling secures an item of display between said second framing and backing sections for visual display through said aperture of said second framing section, said backing section and said second framing member then available to be folded at said first fold line wherein said means for coupling secures an item of display between said first framing member and a rear portion of said backing sections for visual display through said aperture of said first framing section.

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**5,490,740**

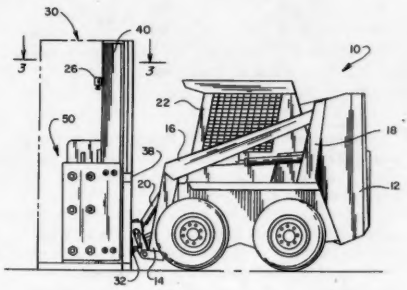
## GROUND STABILIZED TRANSPORTABLE DROP HAMMER

**Robert J. Johnson, 70 N. Monroe Ave., Columbus, Ohio 43203**

**Filed Sep. 22, 1994, Ser. No. 310,654**

**Int. Cl.**[6] **B25D** *17/28;* **E01C** *23/12*

**U.S. Cl. 299—37.4** **23 Claims**




1. A system for impacting a ground surface comprising:

an operator driven host transport apparatus having lifting arms; and

a drop hammer assembly removably coupled to said lifting arms of said driven host apparatus, said drop hammer assembly comprising:

an upstanding frame coupled to said host transport apparatus, said frame having a stabilizing foot portion extending outwardly therefrom for contacting the ground surface during operation of said drop hammer;

a mast attached to said frame and disposed substantially vertical to the ground surface;

a weight assembly having a ground confronting face portion and at least one bearing surface engaging said mast, said weight assembly being operable between a ground position impacting the ground surface and a drop position above said ground surface; and

a manually controlled lifting apparatus for selectively raising said weight assembly to said drop position, said lifting apparatus being actuable to release said weight assembly for its substantial free fall from said drop position to said ground position.

**5,490,741**

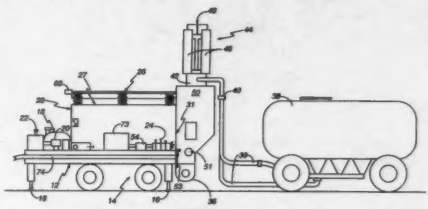
## METERED BLENDING EQUIPMENT FOR SOILS, SLUDGES AND LIQUID/SOLID MIXTURES

**David T. Fryer, Wyomissing, Pa., assignor to Red Rose Environmental, Inc., Sewickley, Pa.**

**Filed Oct. 21, 1993, Ser. No. 140,684**

**Int. Cl.**[6] **B09B** *3/00;* **E02D** *3/12*

**U.S. Cl. 405—128** **10 Claims**



1. Apparatus for stabilizing contaminated soils, sludges and liquid/solid mixtures comprising:

main bin means receiving contaminated soils, sludges and liquid/solid mixtures and having a discharge end;

conveying means within said main bin means moving said contaminated soils, sludges and liquid/solid mixtures to said discharge end;

a source of dry powdered chemicals;

a source of wet chemicals;

collector bin means adjacent to and communicating with said main bin means, receiving dry powdered chemicals from said source of dry powdered chemicals, and wet chemicals from said source of wet chemicals;

mixing chamber means adjacent to said discharge end of said main bin means and to said collector bin means; first metering means at the discharge end of said main bin means metering said contaminated soils, sludges and liquid/solid mixtures to said mixing chamber means;

second metering means metering said dry chemicals to said mixing chamber means;

third metering means metering said wet chemicals to said mixing chamber means;

screen means sizing said contaminated soils, soils and solid/liquid mixtures for delivery to said main bin means; and

an attachment connected to said screen means for delivering processed wet clay soil to said screen means, said attachment comprising:

a container having opposite side walls, a back wall, and an open front;

generally parallel, spaced-apart shafts extending through said container and being rotatably supported on said opposite sides;

drive means for rotating said shafts;

means associated with said shafts for breaking up clumps of wet soil; and

means for vibrating said container and thereby discharging said processed wet clay soil from said container.

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**5,490,742**

## MODULAR PROTECTIVE PIPELINE COVER

**Tommy J. Cronk, P.O. Box 11189 90 Two Rivers Pipeline, Odessa, Tex. 79760**

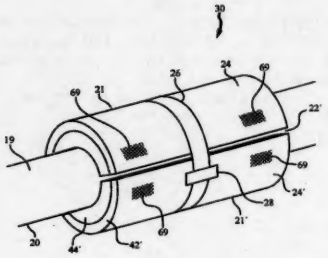
**Filed Jun. 4, 1993, Ser. No. 71,727**

**Int. Cl.**[6] **F16L** *57/00*

**U.S. Cl. 405—157** **20 Claims**

1. A protective pipeline cover for installation on a pipeline section, said cover comprising

a plurality of longitudinal segments, each said segment having a first end, a second end, an inner surface, and an outer surface, each said outer surface having diffuse reflectance greater than about 10%, each said segment comprising at least one wall matrix and at least one layer of puncture-resistant material; and



at least one circumferential tension member for retaining said segments in place around the pipeline section.

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**5,490,743**

**SYSTEM FOR INSTALLING MATERIAL IN THE GROUND**

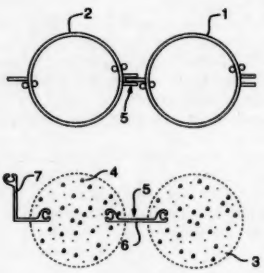
**Enoch S. Vales, Waterloo, Canada, assignor to University of Waterloo, Waterloo, Canada**

**Filed Jun. 20, 1994, Ser. No. 262,277**

**Claims priority, application United Kingdom, Jun. 21, 1993, 9312767**

**Int. Cl.[6] F02D** *7/00*

**U.S. Cl. 405—266** **20 Claims**



1. Procedure for installing a prism of material and a barrier element in the ground, including the steps:

of providing a caisson, wherein:

the caisson has a generally tubular wall, which is such as to form a complete encirclement around a hollow interior;

the wall of the caisson is so formed as to be capable of being pile-driven into the ground as an integral whole tubular unit;

the caisson includes a side-blade, which is of a sturdy and robust character, and which is attached to the outside of the wall of the caisson, and is attached robustly and sturdily enough that the side-blade remains firmly in position on, and integral with, the wall during pile-driving of the caisson;

the side-blade extends in a generally radial direction away from the location at which the blade is attached to the wall;

of pile-driving the caisson down into the ground, whereby the side-blade cuts a slot down through the ground soil adjacent to the caisson wall during the pile-driving;

with the caisson in place in the ground, of extracting the native soil from the hollow interior of the caisson;

with the caisson still in place in the ground, of introducing a body of material into the hollow interior of the caisson;

of withdrawing the caisson up out of the ground, whereby a prism of the material is left in the ground;

of inserting a waterproof barrier element down into the ground, wherein:

the location of the element during and after insertion is such that a first portion of the element lies in the slot cut down into the ground by the side-blade:

the location of the element during and after insertion is such that a second portion of the element extends into, and lies within, the said body of material.

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**5,490,744**

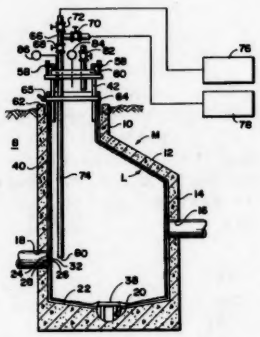
**METHOD AND APPARATUS FOR INFLATING AND CURING A RESIN IMPREGNATED MANHOLE LINER**

**Ronald A. McNeil, 5413 Parkview Rd., Graceville, Fla. 32440**

**Filed Dec. 8, 1993, Ser. No. 162,916**

**Int. Cl.[6] E02D** *29/12*

**U.S. Cl. 405—303** **19 Claims**



1. Apparatus for inflating and curing a liner, comprising:

a) an inflation canister including a top plate and a cylindrical neck extending therefrom for attachment to a liner to be inflated and cured;

b) a first conduit secured to said top plate and communicating with said neck, said conduit including means for simultaneously permitting pressurized heated air and steam to flow thereto and to a liner attached to said canister;

c) a relief valve operably associated with said plate for maintaining the liner at a selected pressure; and

d) a downpipe secured to and extending a substantial distance from said conduit for receipt within the liner so that pressurized air and steam supplied thereto may be discharged therein.

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**5,490,745**

**DEVICE FOR METERING AND ENTRAINING A PRODUCT INTO A GAS STREAM**

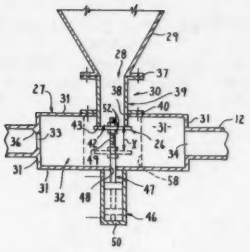
**Charles W. Thiele, Kalamazoo; Tunis J. Willemstyn, Richland; Douglas J. Arndt, and John J. McMullen, both of Kalamazoo, all of Mich., assignors to Motan, Inc., Plainwell, Mich.**

**Continuation of Ser. No. 953,309, Sep. 29, 1992, Pat. No. 5,340,241, which is a continuation-in-part of Ser. No. 830,415, Feb. 4, 1992, abandoned. This application Aug. 22, 1994, Ser. No. 294,150**

**Int. Cl.[6] B65G** *53/46*

**U.S. Cl. 406—132** **17 Claims**

1. In a conveying system for intermittently conveying a dry, solid particulate product through a conduit system interconnecting a product supply container to a desired destination, the conduit system having a gas inlet end for facilitating the entry of a gas stream into the conduit system and a gas outlet end for facilitating the exit of the gas stream from the conduit system, and a gas



pumping means for pumping the gas stream through the conduit system, the improvement comprising an intermittently operated device for metering and entraining a measured quantity of the product with a gas stream moving in the conduit system, said device including:

an enlarged hollow housing having first means defining a gas inlet opening to an interior of said enlarged housing that is smaller in cross sectional area than the cross sectional area of said housing and connected in fluid communication with the gas inlet end, and second means defining a gas and product outlet opening from the interior of said enlarged housing, said gas inlet opening and said gas and product outlet opening being series connected to the conduit system so that all of a gas stream must enter said enlarged housing through said gas inlet opening in order to get from the gas inlet opening to said gas and product outlet opening;

third means defining a product receiving opening into said interior of said housing intermediate said gas inlet opening and said gas and product outlet opening, said gas inlet opening including inlet means for causing the gas stream to move between said gas inlet opening and said gas and product outlet opening through said interior of said housing and beneath said product receiving opening at a sufficient pick-up velocity to pick up and entrain product entering said interior of said housing in the gas stream;

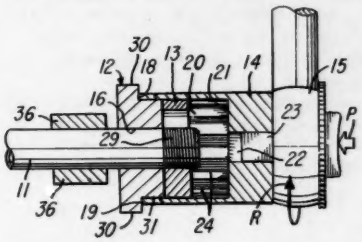
connection means for facilitating a connection of said product receiving opening to the product supply container to facilitate a supply of the product to said interior of said housing through said product receiving opening;

normally closed gate means within said housing, and drive means for moving said gate means between a closed position blocking said product receiving opening to the interior of said housing and an opened position spaced from said product receiving opening for allowing the product to enter the interior of said housing;

control means for intermittently operating said drive means and said gate means to said opened position for a selected interval of time; and

adjustment means for facilitating an adjustment of the spacing between said gate means and said product receiving opening to a set dimension that said gate means always moves to when said gate means is in said opened position to facilitate a controlled metering of the volume of product entering the interior of said housing, the gas stream entering said gas inlet opening picking up and entraining the product therein and exiting said housing through said gas and product outlet opening, said control means effecting a movement of said gate means to said closed position thereof at an end of said selected interval of time to halt the supply of product to said interior of said housing while said gas pumping means continues operating to enable the gas stream to purge the housing and the conduit system of product between said housing and the desired location.

**5,490,746**
**CYLINDRICAL THREAD CUTTING AID**
**Raymond L. Baker, 5370 Cuba Rd., Wilmington, Ohio 45177**
**Filed Aug. 30, 1994, Ser. No. 298,176**
**Int. Cl.[6] B23G** *5/00*
**U.S. Cl. 408—123** **2 Claims**



1. A combination thread cutting aid and thread cutting die wherein said thread cutting aid has leading and trailing surfaces, an inner cylindrical wall extending throughout its length engaging the outer diameter of a pipe to be threaded and closed during the threading, a pair of substantially parallel outer cylindrical walls, one having a larger outer diameter than the other and parallel with said inner cylindrical wall with both outer cylindrical walls being annular surfaces and a shoulder between said outer walls which is substantially perpendicular to said outer walls, and wherein said thread cutting die has inner and outer surfaces, a leading surface and a trailing surface, and full fluted socket member open at both ends and having an interior portion containing an internal shoulder, an exterior portion, a leading end constituting a larger opening, a trailing end constituting a smaller opening and internal flutes and valleys extending from said leading end to said internal shoulder and wherein said smaller opening is capable of receiving a ratchet wrench driver.

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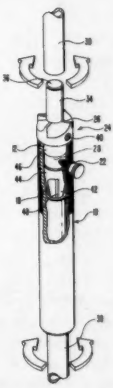
**5,490,747**
**MULTI-PURPOSE ARROW ASSEMBLY TOOL**
**Louis Rangel, 11 North 3175 East, Layton, Utah 84040**
**Division of Ser. No. 181,171, Jan. 12, 1994, Pat. No. 5,435,673.**
**This application May 31, 1995, Ser. No. 455,392**
**Int. Cl.[6] B23B** *45/06*
**U.S. Cl. 408—227** **2 Claims**



1. A deburring tool intended for use in deburring arrow shafts, the tool comprising:

(a) a handle having an implement receiving end, an arrow shaft receiving end, and a centrally disposed elongate member connecting the implement receiving end and the arrow shaft

receiving end, said handle having formed in the interior thereof a longitudinally extending alignment bore, said alignment bore having a diameter of sufficient size so as to be capable of receiving an arrow shaft;

(b) a deburrer having a substantially conical cutting portion contiguous to a stopper portion, said conical cutting portion having a shape capable of being inserted into an arrow shaft and said stopper portion capable of being received within said alignment bore of said implement receiving end of said handle; and

(c) securing means for selectively fixing said deburrer within said alignment bore of said implement receiving end of said handle, thereby permitting said handle and said deburrer to work concomitantly.

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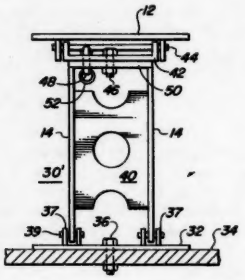
**5,490,748**

**REVERSIBLE RAIL CAR STANCHION**

**Martin J. Hapeman, Edinboro, Pa., assignor to General Electric Company, Erie, Pa.**

**Filed Jan. 6, 1995, Ser. No. 369,223**
**Int. Cl.[6] B60P** *3/07*
**U.S. Cl. 410—64** **15 Claims**




1. A stanchion for supporting a semi-trailer for transport on a bed of a rail car comprising:

a generally vertically-oriented support member having a base end and a top end;

a fifth wheel mounted to said top end of said vertically-oriented support member;

a diagonal strut attached to said vertically-oriented support member near said top end and having a base end, said strut extending angularly downward from said vertically-oriented support member;

a plate member positioned on a rail car bed, said plate member including a first pin extending therethrough and through said rail car bed for pivotally mounting said plate member to said rail car, and further including a second pin releasably extending through said plate member and into said rail car bed for preventing rotation of said plate member; and

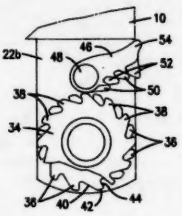
attachment means mounted to a top surface of said plate member for attaching the base end of said vertically-oriented support member and the base end of said diagonal strut to said plate member, whereby the orientation of said fifth wheel is reversible by rotation of said first plate member about said first pin.

**5,490,749**

**WINCH CONSTRUCTION FOR CARGO TIE-DOWN STRAPS**

**Jose L. A. Arbues, Avda. Páez, Residencias Morichal P.H.B. El Pinar., Caracas - Código Postal 1021, Venezuela**

**Filed Feb. 22, 1995, Ser. No. 392,102**
**Int. Cl.[6] B61D** *45/00*
**U.S. Cl. 410—103** **4 Claims**




1. In a cargo tie-down system having at least one flexible strap secured at one end to a vehicle and drawn over cargo carried on the vehicle, a winch construction comprising:

a frame secured to the vehicle;

a winch drum mounted on said frame for rotation about a generally horizontal rotational axis, said drum being adapted to receive the strap and to wind the strap thereon;

a ratchet wheel carried on said drum and presenting first and second sets of ratchet teeth on the periphery of said wheel, the teeth in said first set being offset from the teeth in said second set in a direction axially of said drum and being staggered relative to the teeth in said second set with each tooth in the first set being situated between an adjacent pair of teeth in the second set; and

a pawl connected with said frame for movement about a generally horizontal pivot axis between engaged and release positions, said pawl having first and second sets of pawl teeth offset and staggered in an arrangement to effect locking engagement between the first set of pawl teeth and the first set of ratchet teeth and between the second set of pawl teeth and the second set of ratchet teeth in the engaged position of the pawl to lock the winch drum against rotation in one direction.

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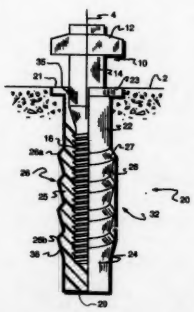
**5,490,750**

**ANCHORING DEVICE FOR A THREADED MEMBER**

**William P. Gundy, 250 Elm St., Milford, N.H. 03051**

**Filed Jun. 9, 1994, Ser. No. 257,838**
**Int. Cl.[6] F16B** *13/06*
**U.S. Cl. 411—55** **16 Claims**




1. An anchoring device for anchoring a threaded member in a substrate material, comprising:

a plastic anchoring sheath having a first end, a second end, and a body portion disposed between said first and said second

end, said plastic anchoring sheath adapted to be fixed in said substrate material and to receive a treaded member;

a plurality of annular anchoring ribs formed around the body portion of said anchoring sheath; and

at least three longitudinal ribs extending along at least a segment of said body portion of said plastic anchoring sheath, each of said at least three longitudinal ribs extending outwardly from said anchoring sheath and disposed in different planes which intersect at a longitudinal axis of said anchoring sheath.

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**5,490,751**

**FASTENING DEVICE WITH REMOVABLE AXIAL GUIDING STOP**

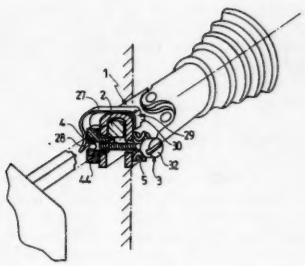
**Jean-Claude Courgeon, Vendome, France, assignor to NACAM, Vendome, France**

**Filed Jan. 8, 1993, Ser. No. 1,614**

**Claims priority, application France, Jan. 10, 1992, 92 00225**

**Int. Cl.[6] F16B** *33/00*

**U.S. Cl. 411—368** **34 Claims**



1. Fastening device for assembling at least two elements, the fastening device comprising:

a screw including a head and a threaded stem, the head being arranged proximate a first external surface of a first one of the elements to be assembled;

a nut including internal threads for engaging with the stem of the screw, the nut being arranged proximate a second external surface of a second one of the elements to be assembled;

removable guiding stop means, arranged between the first external surface and the head of the screw, for providing, in a first stage, axial prepositioning of the screw and the nut and for permitting, in a second stage, penetration of the threaded stem of the screw into the internal threads of the nut through torquing of the screw and the nut, the guiding stop means having an axial opening through which the stem of the screw extends and through which the head of the screw is prevented from passing, an axial force exerted on the guiding stop means during torquing of the screw and the nut causing the guiding stop means to clear the screw so that the head of the screw engages with the first external surface of the first one of the elements to be assembled; and

the guiding stop means having a length from one end to another, the first and second elements to be assembled have a thickness, and the stem of the screw having a length, the length of the guiding stop means, the thickness of the first and second elements to be assembled, and the length of the screw being such that, when the stem of the screw extends through the guiding stop means and the head of the screw abuts against one end of the guiding stop means, and the stem of the screw extends through the first and second elements to be assembled, a leading thread of the screw mates with a leading thread of the nut.

**5,490,752**

**BAR STORAGE APPARATUS**

**Toru Tokiwa, and Takayoshi Hasegawa, both of Hadano, Japan, assignors to Amada Company, Limited, Isehara, Japan**

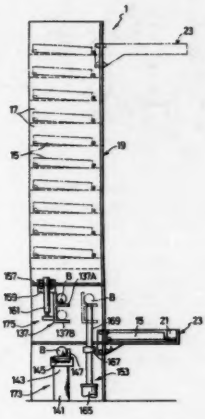
**Division of Ser. No. 73,063, Jun. 8, 1993, Pat. No. 5,427,490.**

**This application Mar. 1, 1995, Ser. No. 396,610**

**Claims priority, application Japan, Jun. 9, 1992, 4-149475; Jun. 18, 1992, 4-159238; Jan. 27, 1992, 4-288414**

**Int. Cl.[6] B21D** *43/20*

**U.S. Cl. 414—280** **6 Claims**



1. A bar storage apparatus for supplying bars to a bar processing machine, comprising:

a shelf frame having a plurality of pallet accommodating shelves arranged vertically;

an elevator device disposed on one side of said shelf frame so as to be movable up and down, the shelves and the elevator device accommodating pallets;

a traverser for moving a pallet between the pallet accommodating shelf and the elevator device, and between the elevator device and a predetermined position;

a bar lifting device for lifting the bar upwardly from a position of the pallet located at the predetermined position;

a bar conveying device for receiving the bar from the bar lifting device and conveying the received bar in a lateral direction of the bar; and

a bar feeding device for receiving the bar from the bar conveying device and feeding the received bar in a longitudinal direction of the ba-

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**5,490,753**

**ROLL ON ROLL OFF DEVICE**

**Richard Green, P.O. Box 249, Titus, Ala. 36080**

**Filed Jan. 8, 1993, Ser. No. 1,960**

**Int. Cl.[6] B60P** *3/42;1/54*

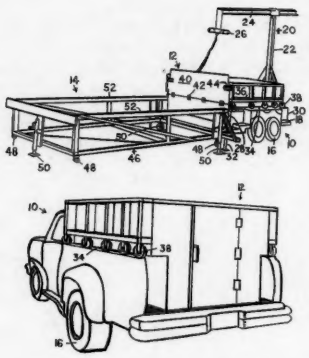
**U.S. Cl. 414—498** **11 Claims**

1. A transport vehicle, a modular container adapted to contain product to be transported and a support storage platform;

said transport vehicle adapted to receive and unload said modular container from and to said support storage platform;

said modular container having a bottom surface that is adapted to support carried products and a center of gravity, said center of gravity being a given vertical distance above said bottom surface;

said transport vehicle, modular container and support storage platform each having cooperating anti-friction mechanisms, laying in a plane, that will support said modular container on said transport vehicle or support storage platform, with the center of gravity of said container being displaced vertically



from said plane while supported by either the transport vehicle or said support storage platform a distance less than said given distance, to thereby provide a stable support for said modular container and to facilitate movement of said modular container to said transport vehicle from said support storage platform and to said support storage platform from said transport vehicle;

and wherein each of said transport vehicle, modular container and support storage platform have a second cooperating anti-friction mechanism that lie in a horizontal plane that is vertically displaced from said plane.

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**5,490,754**

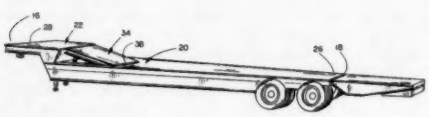
**HYDRAULIC UPPER DECK RAMP FOR A TRAILER**

**Harry E. Voelzke, Mitchell, S. Dak., assignor to Dakota Mfg. Co.,Inc., Mitchell, S. Dak.**

**Filed Apr. 26, 1995, Ser. No. 429,032**

**Int. Cl.[6] B60P** *1/00*

**U.S. Cl. 414—537** **3 Claims**



**1**. A trailer comprising:

a wheeled frame having rearward and forward ends;

means at the forward end of said wheeled frame for connection to a prime mover;

a lower main deck on said wheeled frame having rearward and forward ends;

an upper deck on said wheeled frame positioned forwardly of said main deck and having rearward and forward ends;

said upper deck being positioned above said main deck;

an upper deck ramp having rearward and forward ends;

said upper deck ramp having its rearward end pivotally secured to said main deck;

said upper deck ramp being pivotally movable between a first horizontally disposed position to a second upwardly inclined position;

said upper deck ramp serving as an extension of said main deck when in its said first position;

said upper deck ramp serving as a ramp extending upwardly from said main deck to said rearward end of said upper deck when in its said second position;

a first scissor lift mechanism comprising a lower scissor arm and an upper scissor arm, each of said lower and upper scissor arms having upper and lower ends;

the lower end of said lower scissor arm of said first scissor lift mechanism being pivotally secured to said wheeled frame below the forward end of said upper deck ramp;

the upper end of said upper scissor arm of said first scissor lift mechanism being pivotally connected to said upper deck ramp adjacent the forward end thereof;

said upper end of said lower scissor arm and said lower end of said upper scissor arm of said first scissor lift mechanism being pivotally connected together;

a first hydraulic cylinder having a lower base end and an upper rod end;

said lower base end of said first hydraulic cylinder being pivoted to said wheeled frame means;

said first hydraulic cylinder extending upwardly and forwardly from its base end towards said first scissor lift mechanism;

said rod end of said first hydraulic cylinder being operatively pivotally connected to said lower scissor arm of said first scissor lift mechanism;

a second scissor lift mechanism comprising a lower scissor arm and an upper scissor arm, each of said lower and upper scissor arms having upper and lower ends;

the lower end of said lower scissor arm of said second scissor lift mechanism being pivotally secured to said wheeled frame below the forward end of said upper deck ramp;

the upper end of said upper scissor arm of said second scissor lift mechanism being pivotally connected to said upper deck ramp adjacent the forward end thereof;

said upper end of said lower scissor arm and said lower end of said upper scissor arm of said second scissor lift mechanism being pivotally connected together;

a second hydraulic cylinder having a lower base end and an upper rod end;

said lower base end of said second hydraulic cylinder being pivoted to said wheeled frame means;

said second hydraulic cylinder extending upwardly and forwardly from its base end towards said second scissor lift mechanism;

said rod end of said second hydraulic cylinder being operatively pivotally connected to said lower scissor arm of said second scissor lift mechanism;

the extension of said first and second hydraulic cylinders causing said first and second scissor lift mechanisms to raise said upper deck ramp from its said first position to its said second position so that said forward end of said upper deck ramp is positioned adjacent the rearward end of said upper deck;

said wheeled frame having a substantially vertically disposed frame member positioned forwardly and below the forward end of said upper deck ramp when said upper deck ramp is in its said first position;

the pivotal connection between said upper and lower scissor arms of said first and second scissor lift mechanisms being positioned forwardly of the dead center line extending between the lower pivotal connection of said lower scissor arm and the upper pivotal connection of said upper scissor arm;

said lower scissor arm of each of said first and second scissor lift mechanisms being in engagement with said substantially vertically disposed frame, when said upper deck ramp is in its said second position, so that the load on said upper deck ramp is carried by said substantially vertically disposed frame rather than said hydraulic cylinders.

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**5,490,755**

**SELF-PROPELLED LOADER CARRIER**

**Keith W. Billotte, 2213 Willow La., Clearfield, Pa. 16830**

**Filed Jul. 6, 1994, Ser. No. 271,377**

**Int. Cl.[6] B60P** *1/48*

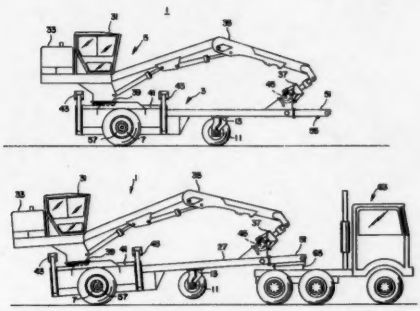
**U.S. Cl. 414—550** **8 Claims**

**1**. Self-propelled loading apparatus comprising:

a carriage, including first and second drive wheels independently powered by first and second hydraulic drive motors, respectively;

a turntable mount, affixed to the carriage;

a hydraulic knuckle boom loader supported on the carriage by the turntable mount, including a hydraulic pump for providing



hydraulic power, rotation means for rotating the knuckle boom loader on the turntable mount, control means for selectively controlling application of hydraulic power to the rotation means, the knuckle boom loader and each of the first and second drive motors such that the apparatus is maneuverable;

wherein the first and second drive wheels have a common axis and wherein the carriage includes a free-turning nose wheel mounted on a pivotable caster spaced from the common axis;

wherein the carriage includes tow means for removably connecting the carriage to fi mating tow hitch on a tow vehicle, whereby the carriage can be trailered by the tow vehicle; and,

wherein the hydraulic knuckle boom loader comprises grasping means at a free end.

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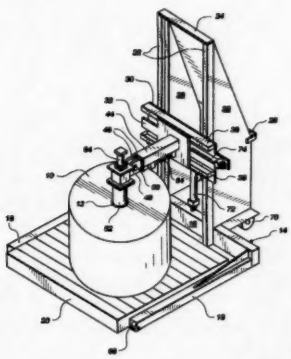
**5,490,756**
**MANIPULATION AND TRANSPORT DEVICE FOR ROLLED MATERIALS**
**Ronald E. Reichert, Orem, and Donald Beuch, Midvale, both of Utah, assignors to RTI Corporation, Orem, Utah**
**Filed Apr. 29, 1993, Ser. No. 55,219**
**Int. Cl.[6] B66C *1/54***
**U.S. Cl. 414—619** **2 Claims**



1. A manipulation and transport device for rolled materials having a central core, said manipulation and transport device comprising:

a U-shaped transportable base comprising two elongate legs and an elongate main support member, the two legs mounted on the main support member to extend substantially horizontally therefrom, the legs substantially parallel to each other to straddle a shipping pallet on two sides, one or more swivel wheels mounted on the main support member, and wheels mounted on the two legs;

two or more vertical support members mounted on and extending upwardly from the main support member, opposing channels formed in the two or more vertical support members to form substantially parallel, substantially vertical guides;

a horizontal support member comprising a first plate having front and back sides, a second plate having front and back sides, and bearings, the first plate movably mounted to the two or more vertical support members, the bearings mounted on the back side of the first plate to travel in the guides of the vertical support members, and the back side of the second plate movably mounted to the front side of the first plate to move thereon in a horizontal direction;

an elongate mandrel having first and second ends and a long axis, said mandrel pivotally mounted at the first end to the front side of the second plate to selectively pivot between a substantially vertical, to a substantially horizontal position, said mandrel further including a plurality of expandable jaws disposed on the mandrel between the first and second ends to selectively radiate outwardly from the long axis of the mandrel to frictionally and releasably engage the central roll core of the rolled materials;

expansion means disposed within the mandrel substantially along its long axis to selectively exert outward pressure on the jaws;

means for causing the horizontal support member to selectively move vertically;

means for causing the second plate of the horizontal support member to selectively move in a horizontal direction; and

means for causing the mandrel to selectively pivot.

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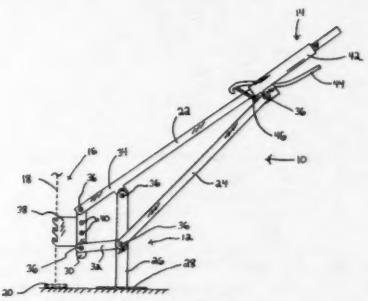
**5,490,757**
**LIFTING APPARATUS**
**Daniel Stratman, 1812 Park Ave., Alton, Ill. 62002**
**Filed Apr. 2, 1993, Ser. No. 41,934**
**Int. Cl.[6] B66C *1/00***
**U.S. Cl. 414—680** **21 Claims**



1. A lifting apparatus for raising furnishings during removal and installation of floor covering, comprising:

means for supporting a lifting apparatus at a distance from a work area;

means for leveraging an item to be raised and lowered, the leveraging means supported for pivoting movement by a portion of the supporting means, and the portion of the supporting means providing pivoting support of the leveraging means providing a fulcrum for the leveraging means;

a four bar linkage assembly, the linkage assembly formed by the leveraging means and the supporting means, a vertical link member and a lower link member, the vertical link of the four bar linkage assembly moving in a substantially vertical path;

means for engaging a portion of the furnishing to be raised, the engaging means carried by the link moving in the substantially vertical path; and

means for controlling the position of the leveraging means comprising a combination sliding member sliding relative to the leveraging means and a control arm, the sliding means and control arm providing a complementary four bar linkage in

which the supporting means forms a stationary link of the linkage, and the leveraging means forms a link of the linkage, the controlling means further including engagable locking means which when engaged prevents movement of the leveraging means, thereby maintaining the engaging means in a desired position.

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**5,490,758**

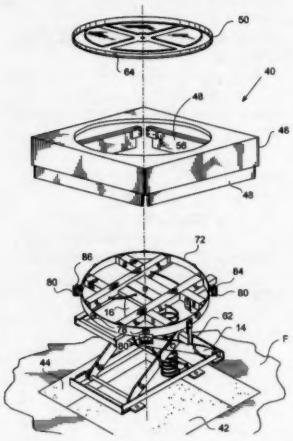
**PIT-MOUNTED LOAD ELEVATOR**

**Robert M. Stone, Tucson, Ariz., assignor to Bishamon Industries Corporation, Ontario, Calif.**

**Continuation-in-part of Ser. No. 14,344, Feb. 5, 1993, abandoned, which is a continuation-in-part of Ser. No. 695,692, May 3, 1991, Pat. No. 5,299,906. This application Jun. 28, 1994, Ser. No. 267,443**

**Int. Cl.[6] B65G** *57/22*

**U.S. Cl. 414—792.3** **21 Claims**




1. A self-adjusting load elevator for mounting in a pit in a floor, comprising:

a base, a rotatable load platform, and a vertically expandable scissors linkage mechanically coupled between the load platform and the base;

a fluid actuator chamber mechanically coupled to said scissors linkage and adapted to actuate the scissors linkage, said actuator chamber being expandable and contractible;

an isobaric fluid system fluidly coupled to said actuator chamber to provide a fluid to the actuator chamber when it expands and to receive back fluid therefrom when it contracts, said fluid system comprising a fluid reservoir and a fluid source coupled thereto;

a fluid inlet/outlet valve fluidly coupled to the fluid system to control a pressure thereof; and

means for preventing a rotation of the load platform when it is approximately flush with the floor.

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**5,490,759**

**MAGNETIC DAMPING SYSTEM TO LIMIT BLADE TIP VIBRATIONS IN TURBOMACHINES**

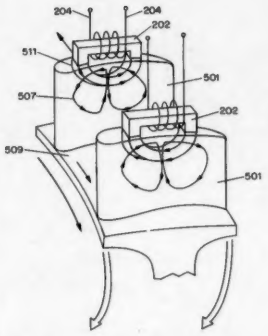
**Jay Hoffman, 38 Yorktown Cir., Trumbull, Conn. 06611**

**Filed Apr. 28, 1994, Ser. No. 234,942**

**Int. Cl.[6] F01B** *25/06*

**U.S. Cl. 415—10** **16 Claims**

1. An apparatus for damping the vibrations of an array of blades rotating within a casing of a turbomachine, comprising:




at least one electromagnet coupled to the casing and having poles spaced from the edges of the rotating blades to generate vibration damping eddy currents in the blades; and

an automatic controller responsive to a condition causing blade vibration for energizing the electromagnet to generate vibration damping eddy currents in the blades.

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**5,490,760**

**MULTISHAFT GEARED MULTISHAFT TURBOCOMPRESSOR WITH RETURN CHANNEL STAGES AND RADIAL EXPANER**

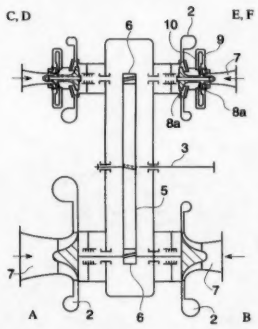
**Joachim Kotzur, Oberhausen, Germany, assignor to Man Gutehoffnungshütte AG, Oberhausen, Germany**

**Filed Oct. 14, 1993, Ser. No. 138,404**

**Claims priority, application Germany, Jan. 15, 1992, 42 34 739.4**

**Int. Cl.[6] F04D** *17/12*

**U.S. Cl. 415—68** **21 Claims**




1. A multistage geared multishaft turbocompressor, comprising:

a first pinion shaft:

a first low pressure stage including a volute housing with a first stage individual blade wheel, said first stage individual blade wheel being connected to one end of said first pinion shaft;

a second low pressure stage, including a volute housing and a second stage individual blade wheel, said second stage individual blade wheel being connected to another end of said first pinion shaft:

an additional pinion shaft extending parallel to said first pinion shaft;

a high pressure stage group including a high pressure stage first blade wheel and a high pressure stage second blonde wheel, said high pressure stage first blade wheel and said high pressure stage second blade wheel being disposed adjacent to

each other, arranged one behind the other, at one end of said additional pinion shaft;

a high pressure stage housing including means defining an intake for said first blade wheel of said high pressure stage group and theaters defining an outlet adjacent said first blade wheel of said high pressure stage group, a disk diffuser connected to said first blade wheel outlet, a return ring connecting said disk-shaped diffuser to an inlet adjacent said second blade wheel of said high pressure stage group and a volute housing portion surrounding said second blade wheel of said high pressure stage group;

drive means for driving in rotation each of said first pinion shaft and said additional pinion shaft, said drive means including a central gear connected to a first pinion disposed on said first pinion shaft and connected to an additional pinion disposed on said additional pinion shaft:

a first bearing set supporting said first pinion shaft to support said first blade wheel of said high pressure stage group and said second bade wheel of said high pressure group in an overhung manner with no additional bearing between said one end of said additional pinion shaft and said first bearing set;

a central gear bearing set Supporting a drive shaft and supporting said central gear; and

an additional bearing set supporting said additional pinion shaft to support said first stage individual blade wheel in an overhung manner and to support said second stage individual blade wheel in an overhung manner.

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**5,490,761**

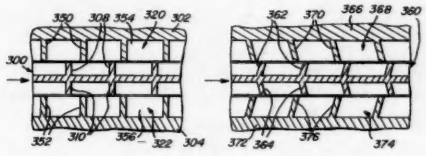
## HIGH PERFORMANCE TURBOMOLECULAR VACUUM PUMPS

**Marsbed Hablanian, Wellesley, Mass., assignor to Varian Associates, Inc., Palo Alto, Calif.**

**Division of Ser. No. 875,891, Apr. 29, 1992, Pat. No. 5,358,373. This application Jun. 6, 1995, Ser. No. 469,970**

**Int. Cl.[6] F01D** *1/36*

**U.S. Cl. 415—90** **5 Claims**




1. A turbomolecular vacuum pump comprising:

a housing having an inlet port and an exhaust port;

a plurality of vacuum pumping stages located within said housing and disposed between said inlet port and said exhaust port, each of said vacuum pumping stages including a rotor and a stator;

means for rotating said rotors such that gas is pumped from said inlet port to said exhaust port; and

one or more of said vacuum pumping stages comprising a regenerative stage including a rotor comprising a disk having first, spaced-apart rotor ribs formed in an upper surface and second, spaced-apart rotor ribs formed in a lower surface, said disk constituting a regenerative impeller, said regenerative stage further including a stator comprising spaced-apart stator ribs, said stator defining a first annular channel in opposed relationship to said first rotor ribs, a second annular channel in opposed relationship to said second rotor ribs, each said first and second channel comprising said spaced-apart stator ribs, and a conduit between said first and second annular channels, the stator of said regenerative stage further including a blockage in each of said first and second annular channels so that gas flows in series through said first annular channel and said second annular channel.

**5,490,762**

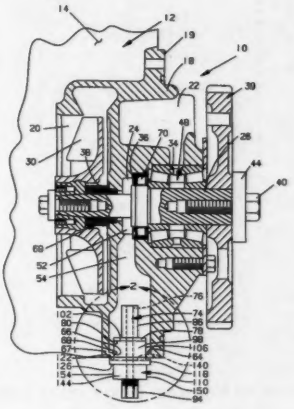
## WEEP HOLE PLUG FOR A FLUID CIRCULATING PUMP

**Joel D. Feucht, Morton; Stephen G. Shoup, and Victor E. Swanson, both of Peoria, all of Ill., assignors to Caterpillar Inc., Peoria, Ill.**

**Filed Mar. 21, 1995, Ser. No. 407,819**

**Int. Cl.[6] F04D** *29/08*

**U.S. Cl. 415—168.1** **5 Claims**




1. A fluid circulating pump adapted for use in an internal combustion engine and including a housing having a fluid chamber and a cavity, a shaft rotatably mounted within the housing and extending through the cavity and terminating in the in the fluid chamber, and a seal assembly in surrounding relation to the shaft to substantially isolate the fluid chamber from the cavity, comprising:

the cavity having an open end communicating with the atmosphere;

a plug having a bore therethrough and being slidably disposed within and in contacting relationship with the housing at the open end, the plug having a cylindrical head portion and an elongated portion extending from the head portion and terminating within the cavity; and

connecting means attached to the plug for sealingly engaging the plug with the open end so that the plug is held within the housing and fluid is restricted from escaping into the atmosphere.

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**5,490,763**

## PUMP FOR SHEAR SENSITIVE FLUIDS

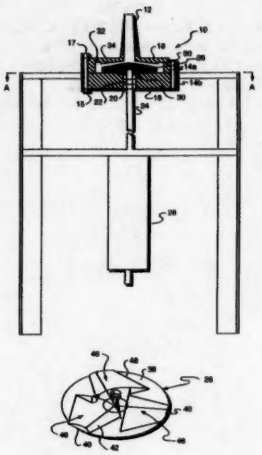
**Andrew L. Abrams, 26 Imperial Ave., Westport, Conn. 06880, and Christopher M. Gaylo, 22 Landing La., Princeton Junction, N.J. 08550**

**Filed Sep. 15, 1994, Ser. No. 306,877**

**Int. Cl.[6] F04D** *29/18*

**U.S. Cl. 415—206** **8 Claims**

1. A centrifugal pump for shear sensitive fluids comprising a pump housing having an interior surface defining an interior volume, and an impeller rotatably mounted within said pump housing around a central axis, and comprising at least two airfoil-shaped vanes, each of which has a smoothly contoured, rounded leading edge which blends into a generally parabola-shaped top surface, the leading edge of each vane having a cross-sectional shape which is narrowest adjacent the periphery of the impeller, and the vanes are spaced from the interior surface of the pump housing leaving a gap between the top surface of the vanes and the interior surface of the pump housing whereby a portion of the fluid in the housing flows smoothly over the top surface of the vanes whereby to minimize turbulence and shear.



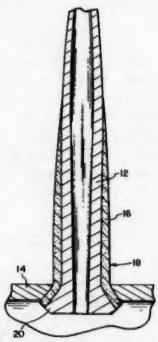


5,490,764

## UNSHROUDED BLADING FOR HIGH BYPASS TURBOFAN ENGINES

Jan C. Schilling, Middletown, Ohio, assignor to General Electric Company, Cincinnati, Ohio

Filed May 23, 1994, Ser. No. 257,602
Int. Cl.[6] F01D 5/16
U.S. Cl. 416—239 19 Claims



1. A metal alloy fan blade for a gas turbine engine, the metal alloy fan

blade comprising:

a blade root;

a blade tip oppositely disposed from the blade root; and

a reinforcing material bonded to a surface of the metal alloy fan blade at the blade root so as to be remote from the blade tip, the reinforcing material being lo provided in a quantity and thickness so as to sufficiently stiffen the metal alloy fan blade and thereby provide frequency and stability control to the fan blade;

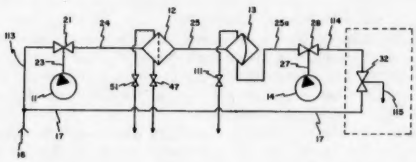
whereby the reinforcing material sufficiently stiffens the metal alloy fan blade so as to make unnecessary the use of a part span shroud.

5,490,765

## DUAL STAGE PUMP SYSTEM WITH PRE-STRESSED DIAPHRAGMS AND RESERVOIR

David C. Bailey, and Carl A. Martin, both of San Jose, Calif., assignors to Cybor Corporation, San Jose, Calif.

Filed May 17, 1993, Ser. No. 62,871
Int. Cl.[6] F04B 13/00;23/02;23/06;39/16
U.S. Cl. 417—2 11 Claims



1. A dual stage pump system for pumping and filtering high viscosity fluids, the system comprising:

a first pump for pumping fluid from an input source through a filtering media and into a reservoir,

the filtering media disposed between the first pump and the reservoir, the first pump being capable of pumping liquid through the filtering media to the reservoir,

the reservoir disposed between filtering media and a second pump, the second pump being capable of withdrawing liquid from the reservoir, the reservoir providing filtered fluid to the second pumping means,

the second pump pumping fluid received from the reservoir means through a discharge outlet of said second pump,

wherein the discharge outlet of the second pump is connected to a three-way valve, said valve having at least two alternative positions including one position in which the discharge outlet is in communication with a dispensing outlet, and a second position in which the discharge outlet is in communication with a recirculation conduit,

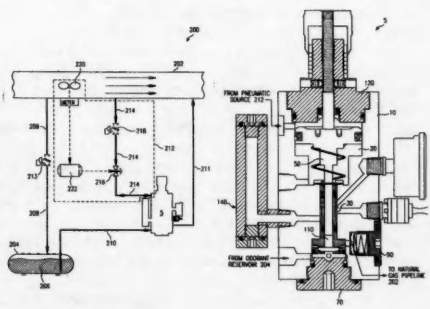
the recirculation conduit being in communication with a input source of fluid to the first pumping means.

5,490,766

## PRECISION SMALL DISPLACEMENT FLUID PUMP

Mark V. Zeck, Hermleigh, Tex., assignor to Y-Z Industries Sales, Inc., Snyder, Tex.

Filed Feb. 24, 1995, Ser. No. 394,288
Int. Cl.[6] F04B 21/00;35/02
U.S. Cl. 417—63 14 Claims



1. A fluid pump for pumping a liquid containing dissolved gas, comprising:

a housing having an interior bore, said interior bore having first and second ends, an inlet proximate said second end of said interior bore, and an outlet proximate said second end of said interior bore;

an inlet valve for allowing a fluid to flow only into said interior bore through said inlet, said fluid comprising a liquid containing dissolved gas;

an outlet valve for allowing said fluid to flow only from said interior bore through said outlet;

an inlet bushing disposed within said interior bore proximate said inlet;

a plunger assembly reciprocatively disposed within said interior bore, said plunger assembly having a first end reciprocatively disposed within said inlet bushing;

a first annular seal disposed on said inlet bushing for fluidly sealing said plunger assembly to said interior bore;

a pump chamber defined by said interior bore, said first annular seal, said inlet bushing, said inlet valve, said outlet valve, and said first end of said plunger assembly, said pump chamber having a volumetric efficiency sufficient to displace gas from said pump chamber;

a hollow spacing member disposed on said first annular seal;

a second annular seal disposed on said spacing member for fluidly sealing said plunger assembly to said interior bore;

a closed lubricating fluid reservoir in fluid connection with said interior bore between said first annular seal and said second annular seal;

a lubricating fluid within said lubricating fluid reservoir; and

pressure indicating means fluidly connected to said lubricating fluid reservoir;

wherein said first end of said plunger assembly is for reciprocating to displace a precise volume of said fluid from said pump chamber through said outlet; and

wherein a failure of said first annular seal is indicated on said pressure indicating means by a pressure differential responsive to said reciprocation of said plunger assembly.

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**5,490,767**

## VARIABLE DISPLACEMENT PISTON TYPE COMPRESSOR

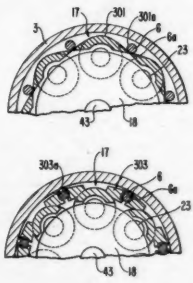
**Hiroshi Kanou, Takasaki; Kiyoshi Terauchi, Isesaki; Isamu Fukai, Fujioka, and Toshiyuki Ogura, Yamada, all of, Japan, assignors to Sanden Corporation, Gunma, Japan**

**Filed Aug. 31, 1993, Ser. No. 114,244**

**Claims priority, application Japan, Sep. 2, 1992, 4-067247 U**

**Int. Cl.[6] F04B** *1/26;1/16*

**U.S. Cl. 417—222.1** **24 Claims**




1. A piston type compressor comprising:

a compressor housing enclosing a crank chamber, a suction chamber, and a discharge chamber therein, said compressor housing including a cylinder block;

a plurality of cylinders formed in said cylinder block;

a plurality of pistons slidably disposed within each of said cylinders, each of said pistons having a corresponding axis;

a drive shaft rotatably supported in said cylinder block;

a plate tiltably connected to said drive shaft;

a bearing coupling said plate to said pistons, so that said pistons may be driven in a reciprocating motion within said cylinders upon rotation of said plate;

at least one working chamber defined by an end of each of said pistons and an inner surface of each of said cylinders;

a support portion disposed coaxially with said drive shaft and tiltably supporting a central portion of said plate;

a tilt control device driving said support portion axially along said drive shaft to move a central portion of said plate axially along said drive shaft to change the angle of tilt of said plate, said pistons adapted to be reciprocally moved in said cylinders in accordance with a tilting motion of said plate; and

a rotation prevention mechanism preventing each of said pistons from rotating about said corresponding axis, said rotation prevention mechanism including a first rotation prevention device formed on a center of said piston and a second rotation prevention device disposed within said compressor housing, said first rotation prevention device having at least one first sliding surface formed thereon, said second rotation prevention device having at least one second sliding surface formed on a peripheral surface thereof, said first sliding surface of said first rotation prevention device smoothly sliding on said second sliding surface of said second rotation prevention device, so that said first rotation prevention device and said second rotation prevention device cooperate to prevent each of said pistons from rotating about said corresponding axis,

wherein said first rotation prevention device comprises a projection extending from a center of said piston, said projection having a semicylindrical groove formed thereon, and wherein said second rotation prevention device comprises a rotation prevention member fixed to the inside of said compressor housing,

and wherein an entire surface of said semicylindrical groove is in sliding contact with a surface of said rotation prevention member.

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**5,490,768**

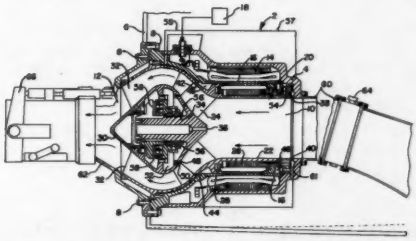
## WATER JET PROPULSOR POWERED BY AN INTEGRAL CANNED ELECTRIC MOTOR

**Luciano Veronesi, and James A. Drake, both of O'Hara Township, Allegheny County, Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.**

**Filed Dec. 9, 1993, Ser. No. 164,892**

**Int. Cl.[6] F04B** *35/04*

**U.S. Cl. 417—356** **29 Claims**



1. A water jet propulsor for a marine vessel comprising:

a generally hollow housing having an inlet end and an outlet end;

attachment means on said housing for securing said housing to a hull of a marine vessel;

an annular stator hermetically sealed and mounted inside said housing;

energizing means for supplying electrical power to said stator;

a hub centrally positioned inside and secured to said housing to allow water to flow therepast;

an impeller assembly rotatably mounted in said housing and to said hub, said impeller assembly including a tubular suction shroud extending through and rotatable relative to said annular stator, a shaft extending into and rotatably connected to said hub, an impeller secured to said tubular suction shroud, and an annular, hermetically sealed rotor mounted around said

tubular suction shroud and inside said annular stator, such that rotation of said impeller assembly produces a pressurized water flow through said housing from said intake end to said outlet end.

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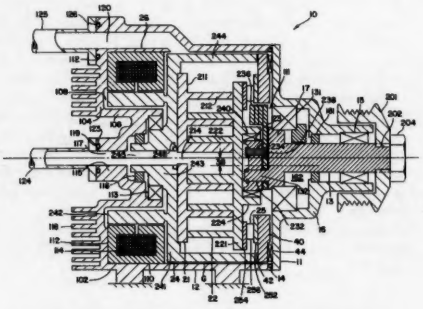
**5,490,769**

## VARIABLE CAPACITY SCROLL TYPE FLUID DISPLACEMENT APPARATUS

**John L. Calhoun, Dallas, Tex., assignor to Sanden International (U.S.A.), Inc., Wylie, Tex.**

**Continuation of Ser. No. 5,387, Jan. 15, 1993, abandoned.**
**This application Nov. 14, 1994, Ser. No. 340,460**
**Int. Cl.[6] F01C** *1/04;17/06;21/16*
**U.S. Cl. 418—1** **55 Claims**



**1**. A scroll-type fluid displacement apparatus comprising:

a housing having a fluid inlet port and a fluid outlet port;

a first scroll disposed within said housing and having an end plate from which a first spiral wrap extends into the interior of said housing;

a second scroll having an end plate from which a second spiral wrap extends, said first and second wraps interfitting at an angular and radial offset to form a plurality of line contacts which define at least one pair of sealed off fluid pockets;

a driving mechanism operatively coupled to one of said first or second scrolls to effect relative orbital motion between said scrolls;

means for mounting said one of said scrolls for orbital and rotational motion with respect to said housing; and

coupling means for coupling said scrolls at a fixed, continuous radial and axial offset, wherein said first scroll is operatively coupled through said coupling means for rotation with said second scroll.

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**5,490,770**

## VANE PUMP HAVING VANE PRESSURIZING GROOVES

**Naoki Oogushi, Toyota, Japan, assignor to Aisin Seiki Kabushiki Kaisha, Kariya, Japan**

**Filed Nov. 28, 1994, Ser. No. 348,162**
**Claims priority, application Japan, Nov. 26, 1993, 5-297106**
**Int. Cl.[6] F04C** *2/344;15/04*
**U.S. Cl. 418—27** **15 Claims**

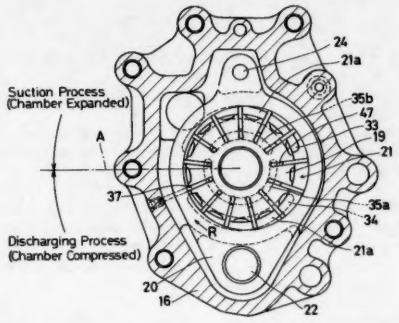
**1**. A vane pump comprising:

a housing having a suction port and a discharge port;

a cam-ring rotatably disposed in the housing;

a rotor having slits and rotatably disposed in the housing and forming a ring-shaped space in cooperation with the cam-ring;

vanes radially supported in the slits of the rotor and defining separate chambers in the ring-shaped space, said chambers each successively communicating with said suction port and said discharge port during rotation of said rotor to pump a fluid in said chambers from said suction port to said discharge port;




a suction side pressurizing groove and a discharge side pressurizing groove formed in the housing and communicating with inner sides of the vanes in the slits for applying oil pressure thereto, said discharge side pressurizing groove having a length greater than that of said suction side pressurizing groove; and

a passage connecting one of the chambers which is compressed at maximum with said discharge side pressurizing groove for supplying oil pressure from said one of the chambers to said discharge side pressurizing groove, so that a high oil pressure in said one of the chambers is applied to said discharge side pressurizing groove,

wherein said suction side pressurizing groove is positioned such that the inner sides of the vanes defining said one of the chambers do not communicate with said suction side pressurizing groove until said rotor has at least reached a rotational position wherein said one of the chambers communicates with said suction port.

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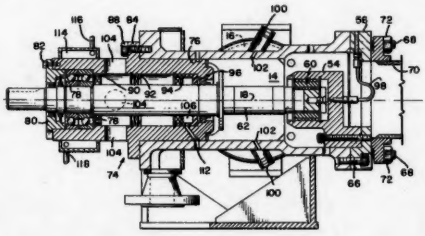
**5,490,771**

## EXTERNAL, SHAFT BEARING ARRANGEMENT, FOR A ROTARY GAS COMPRESSOR

**Wayne F. Wehber, Horseheads; Charles E. Seavey, Painted Post, and James R. Griggs, Elmira, all of N.Y., assignors to Dresser-Rand Company, Corning, N.Y.**

**Filed Jul. 5, 1994, Ser. No. 270,881**
**Int. Cl.[6] F04C** *18/18*
**U.S. Cl. 418—104** **9 Claims**



**1**. An external, shaft bearing arrangement, for a rotary gas compressor, comprising:

a gas compression housing;

a shaft and bearing housing being partially inserted in said compression housing;

a shaft journalled in said shaft and bearing housing; and

bearing means, for rotatably supporting said shaft; mounted within a portion of said shaft and bearing housing; and wherein

said portion of said shaft and bearing housing is external of said compression housing.

5,490,772

## APPARATUS FOR INTRODUCING ARTICLES INTO AND/OR REMOVING ARTICLES FROM A MACHINE

Karl-Josef Gaigl, Gaisenrain 20, D-78224 Singen, Germany

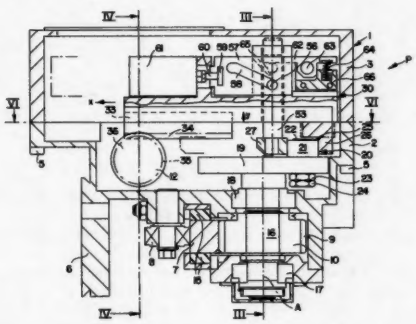
PCT No. PCT/EP92/01433, § 371 Date Jan. 7, 1994, § 102(e) Date Jan. 7, 1994, PCT Pub. No. WO93/01023, PCT Pub. Date Jan. 21, 1993

PCT Filed Jun. 25, 1992, Ser. No. 182,208

Claims priority, application Germany, Jul. 9, 1991, 41 22 617.8

Int. Cl.[6] B29C *45/42;45/14;* B23Q *16/04*

U.S. Cl. 425—126.1 15 Claims



1. An apparatus for at least one of introducing articles into and removing articles from a machine by a handling device, said apparatus comprising:

a transition element for connecting said handling device with said apparatus, wherein said transition element is rotatable about an axis of rotation thereof for driving said handling device;

a slider connected with said transition element for actuating said transition element, wherein said slider has two abutment strip portions removably attached to said slider which form a guide passage;

a cam disc connected to a shaft having an axis, said shaft drivably connected to and driven by said machine for driving said cam disc;

an entrainment member eccentrically arranged on said cam disc and rotatable eccentrically about said axis of said shaft, said entrainment member arranged to move along said guide passage and move said slider between a first and a second limit position, said entrainment member being outside said guide passage when said slider is in one of said first and said second limit position; and

a locking unit including a rotary lever, wherein said rotary lever is actuated by said cam disc and cooperates with at least one of said abutment strip portions for releasably holding said slider in one of said first and said second limit positions.

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5,490,773

## POCKET LIGHTER

Xavier Lloveras Capilla, Barcelona, Spain, assignor to Flamagas, S.A., Barcelona, Spain

Filed Apr. 14, 1994, Ser. No. 227,453

Claims priority, application Spain, Mar. 11, 1994, 9400507

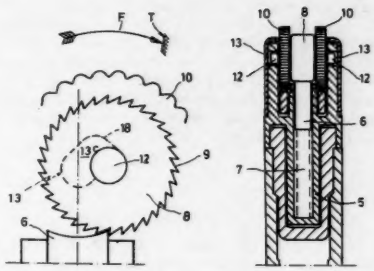
Int. Cl.[6] F23D *11/36*

U.S. Cl. 431—153 7 Claims

1. A pocket lighter comprising:

a body defining a fuel reservoir for holding fuel and having open and closed positions;

a valve for regulating opening and closing of the reservoir, and having an outlet port, wherein when the lighter is in a vertical position, said outlet port defines a fuel outlet level;



a pyrophoric assembly disposed in the body and including a pyrophoric stone;

a wheel including a multitude of exterior teeth;

a rotary shaft supporting the wheel, and having first and second opposite ends;

shaft housing means connected to the body and supporting the ends of the shaft and the wheel for movement between first and second positions;

spring means supported by the body, engaging the pyrophoric assembly and urging said assembly against the wheel, wherein the pyrophoric assembly urges the wheel into the first position;

wherein, when the shaft and the wheel are in the second position, the shaft supports the wheel for rotation against the pyrophoric stone, and the wheel is rotated in a first direction to rub the teeth of the wheel against the pyrophoric stone to generate sparks and to direct the sparks toward said valve; and

wherein, when the shaft and the wheel are in the first position, the pyrophoric assembly engages the wheel and blocks the wheel from rotation in the first direction; and a force in a second direction, different from the first direction, must be applied to the wheel to move the wheel from the first position to the second position.

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5,490,774

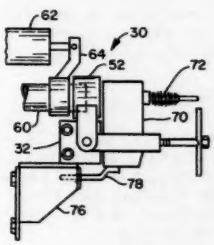
## OIL GUN MOUNTING FOR USE IN STEAM GENERATION BOILERS

Jeffrey S. Mann, Broad Brook; John F. Shea, Newington, both of Conn., and Ronald J. Tenerowicz, Agawam, Mass., assignors to Combustion Engineering, Inc., Windsor, Conn.

Filed Sep. 28, 1994, Ser. No. 313,960

Int. Cl.[6] F23D *11/36*

U.S. Cl. 431—154 8 Claims



1. A mounting for an oil gun in an associated steam generation boiler which comprises:

a stationary union block having first and second output ports for respective fluid streams;

a removable block having first and second input ports dimensioned and configured for registration with said first and second output ports;

means for mounting said stationary union block which comprises a collar welded to an end of an associated guide pipe and means coupling said collar and said stationary union block and allowing relative pivotal moment between said collar and said stationary union; and

means for forcing said removable union block against said stationary union block with the respective ports thereof in registered relationship.

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**5,490,775**

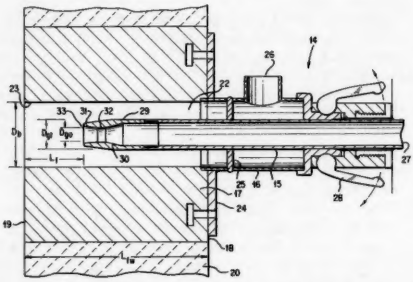
**FORWARD INJECTION OXY-FUEL BURNER**

**Mahendra L. Joshi, Altamonte Springs, and Lee Broadway, Eustis, both of Fla., assignors to Combustion Tec, Inc., Apopka, Fla.**

**Filed Nov. 8, 1993, Ser. No. 149,033**

**Int. Cl.[6] F23C** *7/00*

**U.S. Cl. 431—187** **4 Claims**



**1**. A burner for combustion of a mixture of a fuel and oxygen, mountable on a burner block having a hot face, a cold face opposite said hot face and forming a communication having a circular cross-section between said hot face and said cold face, comprising:

an oxygen conduit;

a fuel conduit disposed concentrically within said oxygen conduit and forming an annulus between said fuel conduit and said oxygen conduit, one end of said fuel conduit extending into said burner block communication at a distance from said burner block hot face;

said fuel conduit having a fuel tip at said one end, said fuel tip having a converging internal diameter followed by a diverging internal diameter in a direction of said burner block hot face, thereby forming a fuel orifice between said converging and diverging diameters; and

a ratio of said distance between said end of said fuel conduit and said burner block hot face to a diameter of said burner block communication being between about 0.5:1 to about 2.0:1.

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**5,490,776**

**INDUSTRIAL FURNACE PROVIDED WITH ROTARY REGENERATIVE BURNER**

**Hiroshi Miyama; Tetsuhiko Ohki; Hitoshi Kaji; Yoshiyuki Yusa, and Yasuo Hirose, all of Kanagawa, Japan, assignors to Chiyoda Corporation, Japan**

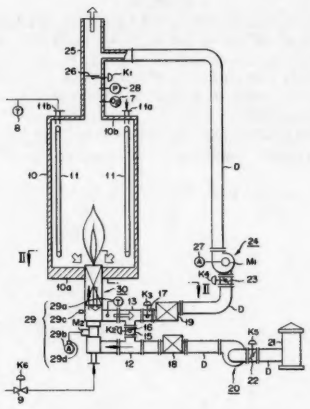
**Filed Mar. 25, 1994, Ser. No. 218,313**

**Claims priority, application Japan, Mar. 29, 1993, 5-070400**

**Int. Cl.[6] F23D** *11/44*

**U.S. Cl. 431—215** **20 Claims**

**1**. In an industrial furnace having disposed on the wall of a combustion chamber at least one rotary regenerative burner comprising a gas permeable regenerator and a duct part communicating with said regenerator of each rotary regenerative burner, and having formed therein an oxidizing agent duct, for passing an oxidizing agent and an exhaust gas duct for passing the exhaust gas from said combustion chamber and adapted to heat said oxidizing agent with the heat of said exhaust gas through said each regenerator while rotating said each regenerator, and said each duct part relative to each other, the improvement being in that said industrial furnace is provided with a bypass allowing inter communication between an oxidizing agent passage communicating with said each oxidizing agent duct, an exhaust gas passage communicating with said each exhaust gas duct, and said bypass and said exhaust gas passage having switching cut-off valves disposed therein.



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**5,490,777**

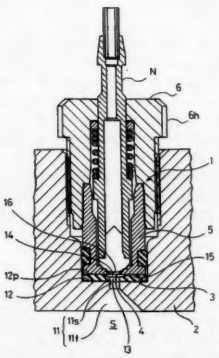
**FUEL GAS SUPPLY ADJUSTER**

**Tadahisa Matsumoto, Tokyo, Japan, assignor to Fujiwara Industrial Co., Ltd., Osaka, Japan**

**Filed Sep. 27, 1993, Ser. No. 127,075**

**Int. Cl.[6] F23A** *14/28*

**U.S. Cl. 431—344** **9 Claims**



**1**. A fuel gas supply adjuster comprising:

a base member having a fueling hole and a flat fitting face formed around a periphery of one open edge of said fueling hole with a side sealing face standing around said fitting face;

a planar elastic member having a first face with a conical recess formed thereon, said conical recess having a fueling hole defined at a bottom of the recess so as to communicate to the fueling hole of said base member;

a membrane filter;

a pressing member having a fueling hole and a flat pressing face formed around one opening edge of the fueling hole; and

an adjusting means for adjusting a pressing force of said pressing member against said elastic member;

wherein said membrane filter and said elastic member are disposed between the pressing face of said pressing member and the fitting face of said base member in such a way that a first surface of said membrane filter is brought into close contact with said first face of said elastic member which has the conical recess formed thereon, a second surface of said membrane filter is brought into close contact with the pressing face of said pressing member, a second face of said elastic member is brought into close contact with the fitting face of said base member, and a side face of said elastic member is brought into close contact with the side sealing face of said base member, respectively.

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**5,490,778**

**BURNER**

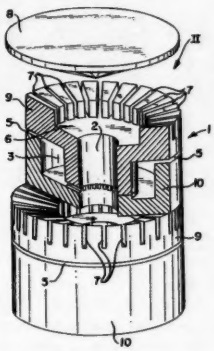
**Willem Meijer, Zelhem, Netherlands, assignor to Dru B.V., Ulft, Netherlands**

**Continuation-in-part of Ser. No. 684,005, Apr. 11, 1991, abandoned. This application Mar. 24, 1993, Ser. No. 36,432**

**Claims priority, application Netherlands, Apr. 12, 1990, 9000883**

**Int. Cl.[6] F23D** *14/58*

**U.S. Cl. 431—349** **11 Claims**




1. A ceramic burner (1) comprising:

a primary conduit (2) for supplying a mixture of combustible gas and air;

a plurality of primary mixture chambers (6), each having at least one inflow opening connected with the primary mixture supply conduit (2), the cross-sectional area of the inflow opening being of the same order as that of the primary mixture supply conduit (2);

a plurality of secondary mixture chambers (3), each secondary mixture chamber being defined by an annular wall element (10), arranged around the primary mixture supply conduit (2) and having several circumferentially spaced radial secondary mixture supply conduits (4), said secondary mixture supply conduits (4) connected with the primary mixture supply conduit (2);

each primary mixture chamber (6) placed downstream of at least one secondary mixture supply conduit (4) and concentric with the primary mixture supply conduit (2), and further having several circumferentially spaced radial primary discharge openings (7) which discharge said mixture of gas and air into a space surrounding the burner (1), the cross-sectional area of the primary discharge openings (7) being small relative to the cross-sectional area of the primary mixture supply conduit (2);

said plurality of primary and secondary mixture chambers (6, 3) placed in vertically spaced relation, each primary mixture chamber (6) located in a flow direction between successive secondary mixture chambers (3), said secondary mixture chamber (3) having a secondary discharge opening arranged opposite said secondary mixture supply conduits and through said wall elements (10); and

flame stabilizing means arranged near the primary discharge openings, said flame stabilizing means formed by at least one secondary mixture chamber (3) being connected to the secondary discharge opening (5) which discharges said mixture of gas and air near the primary discharge openings (7), the cross-sectional areas of the secondary mixture supply conduit (4) and the secondary discharge opening (5) being small relative to the cross-sectional area of the primary mixture supply conduit (2).

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**5,490,779**

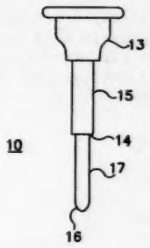
**DENTAL IRRIGATING AND ASPIRATION SYSTEM**

**Oscar Malmin, 3621 Federal Way, Boise, Id. 83705**

**Continuation of Ser. No. 11,711, Feb. 1, 1993, abandoned, which is a continuation-in-part of Ser. No. 705,714, May 23, 1991, Pat. No. 5,203,697. This application May 16, 1994, Ser. No. 242,879**

**Int. Cl.[6] A61G** *1/00*

**U.S. Cl. 433—81** **23 Claims**




1. A dental irrigating and aspirating instrument for use with a handpiece connected to a source of irrigating fluid and vacuum comprising:

engagement means for attaching the irrigating and aspirating instrument to the handpiece and the source of irrigating fluid and vacuum in non-rotatable relationship therewith to provide a fluid communication channel through said engagement means;

a cannula, a proximal end thereof being fixedly attached to said engagement means in fluid communication therewith, for conducting said irrigating and aspirated fluid to and from an endodontic or periodontic operation site;

an elongated member extending beyond a distal end of said cannula and having a closed distal end for engaging a surface at an endodontic or periodontic operation site; and said cannula having at least one through opening in its distal end adjacent said elongated member.

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**5,490,780**

**DENTAL SUCTION CANNULA**

**Ulrich Riewenherm, Isselhorster Str. 234, D-33335 Gütersloh, Germany**

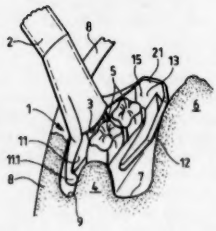
**Filed Mar. 29, 1994, Ser. No. 219,345**

**Claims priority, application Germany, Mar. 30, 1993, 43 10 225.5**

**Int. Cl.[6] A61C** *17/06*

**U.S. Cl. 433—93** **19 Claims**

1. A dental suction cannula, comprising a suction conduit having a suction opening; a protection head connected to an end of said suction conduit for being placed in a patient's mouth; said protection head including a wall structure comprised of a pair of side walls having interconnected ends interconnected by an apex por-




tion of said wall structure; said side walls including spaced-apart free ends such that said wall structure is U-shaped; said side walls being spaced apart to define therebetween a space in which a toothed ridge of a patient's mouth can be received, with said side walls disposed on opposite sides of the toothed ridge, and said apex portion extending across the toothed ridge; said suction opening communicating with said space for suctioning moisture therefrom, a height of said apex portion being at least as great as a height of said interconnected ends of said side walls.

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**5,490,781**

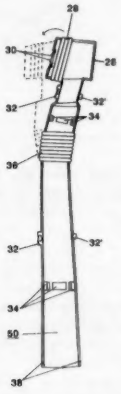
**ADJUSTABLE, SANITARY, NON-REUSABLE HIGH SPEED AND LOW SPEED DENTAL HAND PIECE GLOVE (COVER) AND NOISE REDUCER**

**Eric V. Wade, P.O. Box 8345, Tyler, Tex. 75711**

**Filed Sep. 9, 1992, Ser. No. 942,729**

**Int. Cl.[6] A61C** *1/16*

**U.S. Cl. 433—116** **14 Claims**




**1**. A sanitary, disposable cover for a dental handpiece, said cover comprising;

(a) a flexible, substantially cylindrically shaped upper head section for receiving the head portion of a dental handpiece, said head section including means for adjusting the size of said head section for accommodating different sized handpieces;

(b) a central, substantially cylindrically shaped adjustable neck section for receiving the neck portion of a dental handpiece, said neck section having two ends, one of said ends being joined to said head section, said neck section further including means for adjusting the angular position of said neck section to accommodate different handpiece angulations;

(c) a rigid, substantially cylindrically shaped lower body section for receiving the handle portion of a dental handpiece, said lower body section being joined to the other of said ends of said neck section;

wherein said cover includes first and second half portions, each said half portion including a pair of edge regions extending longitudinally therealong, each said edge region of each half portion including interlocking means therealong which mates with a corresponding interlocking means of each edge region of the other of said half portions, said interlocking means and said edge regions form an interlocking closure seal, adapted to be engaged and disengaged so that a handpiece may be inserted or removed from said cover.

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**5,490,782**

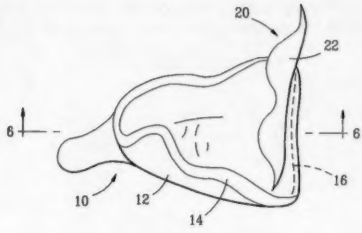
**PREFORMED POSTERIOR PALATEL SEAL FOR EXISTING DENTURES AND METHOD**

**Nelson J. Wong, 2101 Midway Rd., Suite 250, Carrollton, Tex. 75006**

**Filed Jan. 14, 1994, Ser. No. 182,810**

**Int. Cl.[6] A61C** *13/00*

**U.S. Cl. 433—167** **15 Claims**




**1**. A Preformed Poster Palatal Seal (Preformed PPS) for use on existing dentures comprising:

(a) a body preformed with a predetermined, anatomically based size and shape of a posterior palatal seal (PPS) for sealing an upper denture and increasing pressure at the "Ah line" of a human palate; and

(b) means for securing said preformed body to an existing denture at an anatomical position corresponding to the "Ah line" to form a posterior palatal seal thereon.

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**5,490,783**

**FLIGHT SIMULATOR HAVING ACTIVE ELECTRONIC DISPLAY CONTROLS**

**Rocky C. Stephens, and James C. Dutton, both of Fort Worth, Tex., assignors to Lockheed Corporation, Fort Worth, Tex.**

**Filed Jan. 18, 1994, Ser. No. 182,584**

**Int. Cl.[6] G09B** *9/08*

**U.S. Cl. 434—35** **9 Claims**

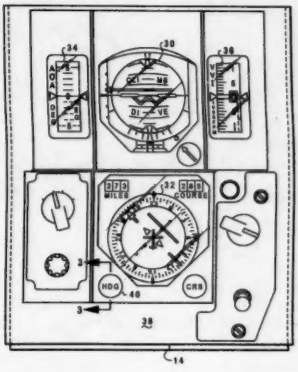
**1**. A simulated instrument panel for utilization in a training device, said simulated instrument panel comprising:

an imperforate electronic display panel for providing a visual output simulative of at least one instrument face;

a bezel mounted and overlying to said imperforate electronic display panel for defining the perimeter of said at least one instrument face;

at least one rotary switch mounted within said bezel at a point overlying said imperforate electronic display panel; and

electronic control circuitry coupled to said rotary switch for selectively varying said visual output simulative of at least one instrument face in response to rotation of said at least one rotary switch.



5,490,784

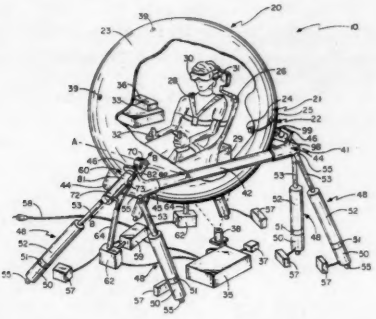
**VIRTUAL REALITY SYSTEM WITH ENHANCED SENSORY APPARATUS**

**David E. E. Carmein, 4921 Upton Ave. South, Minneapolis, Minn. 55410**

**Filed Oct. 29, 1993, Ser. No. 145,413**

**Int. Cl.[6] G09B** *9/00*

**U.S. Cl. 434—55** **11 Claims**



1. A motion simulating device, comprising:

a generally spherical capsule;

a translatable frame for supporting said capsule, the translatable frame including a plurality of beams, a plurality of connecting joints and actuator legs, wherein each connecting joint is rigidly attached to two of said beams and each actuator leg is connected on one end to one of said connecting joints and on the other end to a supporting surface; and

a plurality of rollers connected to said frame and supportively abutting said capsule, wherein at least one of said rollers comprises an active roller for rotationally driving said capsule in any direction.

5,490,785

**AUTOMOTIVE SPLICE CONNECTOR**

**David A. Hein, Sterling Heights, and Robert S. Migrin, Livonia, both of Mich., assignors to Alcoa Fujikura Limited, Brentwood, Tenn.**

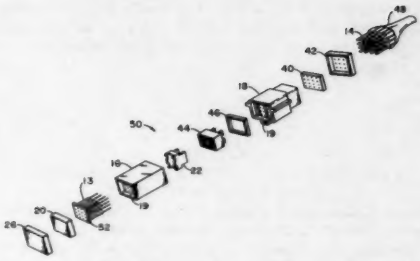
**Filed Oct. 28, 1994, Ser. No. 330,917**

**Int. Cl.[6] H01R** *9/24*

**U.S. Cl. 439—76.1** **8 Claims**

1. A water-tight splice connector, comprising

a first housing having opposed ends,



a plurality of pins mounted in a circuitboard which electrically connects the pins together, said circuitboard being fitted within one end of said housing,

a seal member located in one end of said housing and behind said circuitboard and pins, said seal member assisting in sealing the interior of the housing from outside moisture,

a retainer member located at the one end of said housing and seated behind said seal member to secure the seal member in place in said housing, and

a terminal locking member located in the other end of the housing that locks and aligns the pins in place within the housing.

5,490,786

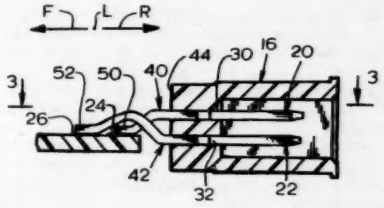
**TERMINATION OF CONTACT TAILS TO PC BOARD**

**Rene A. Mosquera, Laguna Niguel, and Wayne A. Zahlit, Mission Viejo, both of Calif., assignors to ITT Corporation, New York, N.Y.**

**Filed Mar. 25, 1994, Ser. No. 217,792**

**Int. Cl.[6] H01R** *9/09*

**U.S. Cl. 439—79** **7 Claims**



1. A termination arrangement comprising a circuit board having a top face lying in a substantially horizontal plane and having laterally extending front and rear rows of conductive pads on said top face, and a connector which includes a dielectric housing lying rearward of said circuit board, with said dielectric housing lying closer to said rear row of conductive pads than to said front row of conductive pads, said connector including upper and lower laterally extending rows of contacts mounted in said housing, said rows of contacts comprising upper Contacts having upper contact tails and lower contacts having lower contact tails, with each of said contact tails having a forward end joined to one of said conductive pads, said tails having rear ends, with the rear ends of said upper tails lying above the level of said circuit board top face and above the rear ends of said lower tails, with said upper tails extending generally at a downward-forward incline from their rear ends to their front ends, wherein said lower tails are longer than said upper tails but said lower tails have a short forward-to-rearward length and yet the forward ends of said lower tails can be resiliently deflectable to be readily joined to said conductive pads, characterized by:

said lower tails each have a rear portion that extends at an upward-forward incline, a forward portion that extends at a

downward-forward incline, and a middle lying between said portions, with said rear portion extending at an upward-forward incline of an average of about 42° to said horizontal plane.

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**5,490,787**

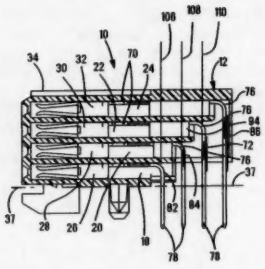
**ELECTRICAL CONNECTOR WITH INTEGRAL SUPPORTING STRUCTURE**

**Michael E. Bowman, Lebanon; Robert S. Correll, Jr., Harrisburg; Donald E. Dellinger, Hellam; Dennis L. Kemmick, Columbia, and Timothy L. Kocher, Camp Hill, all of Pa., assignors to The Whitaker Corporation, Wilmington, Del.**

**Filed Aug. 29, 1994, Ser. No. 297,335**

**Int. Cl.[6] H01R** *23/70*

**U.S. Cl. 439—79** **14 Claims**



**1**. An electrical connector for mounting to a mounting surface of a circuit board and being electrically interconnected to circuitry on said circuit board, said connector comprising:

(a) an insulating housing having a top surface and a bottom surface defining a plane substantially parallel to said top surface, said bottom surface adapted to be mounted to said mounting surface of said circuit board, said housing having a plurality of spaced cavities formed therein stacked vertically between said top and bottom surfaces and separated by relatively thin walls so that each cavity has an upper wall and a lower wall;

(b) a plurality of contacts, one of which is in each respective said cavity, each said contact having a body, a contact portion extending from an end of said body, and a transition member extending from an opposite end of said body at right angles to said plane and joined to said body at a bend, a portion of said body at said bend being in engagement with said upper wall of its respective cavity,

wherein some of said contacts, have a support means extending from its body into engagement with said lower wall of its respective cavity for providing a vertical bearing structure between said upper and lower walls,

said support means arranged so that a longitudinal axis of each said transition member extends through a respective said lower wall, support means, and upper wall of each cavity vertically above thereby defining a vertical bearing structure between said top surface and each said transition member for inserting said transition members into engagement with said circuit board.

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**5,490,788**

**SURFACE MOUNT TERMINAL FOR ELECTRICAL COMPONENT**

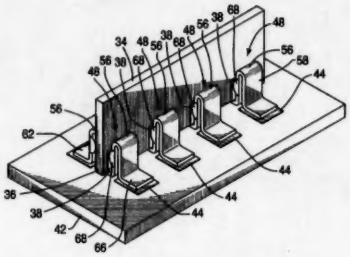
**Joseph B. Mazzochette, Cherry Hill, N.J., assignor to EMC Technology, Inc., Cherry Hill, N.J.**

**Filed Nov. 1, 1994, Ser. No. 332,949**

**Int. Cl.[6] H01R** *9/09*

**U.S. Cl. 439—83** **32 Claims**

**17**. An electrical terminal comprising:



a metal strip having a plurality of spaced tabs extending in the same direction from the strip and forming a U-shaped clip therebetween which is adapted to receive an electrical component therebetween; and

a pair of feet extending in substantially the same plane in opposite directions from the tabs to support the terminal on the surface of a printed circuit board.

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**5,490,789**

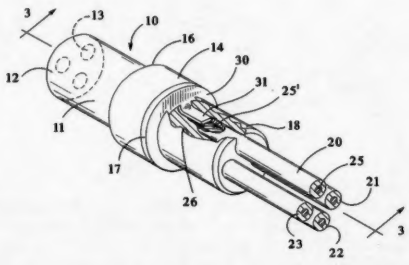
**MOLDED CONNECTOR WITH INTERNAL GROUNDING**

**Raymond B. Simons, River Forest, Ill., assignor to Methode Electronics, Inc., Chicago, Ill.**

**Filed Dec. 22, 1993, Ser. No. 171,818**

**Int. Cl.[6] H01R** *9/00;43/00*

**U.S. Cl. 439—101** **6 Claims**



**1**. An electrical connector having insulated electrical wire, electrical socket contacts, a molded body and an internal ground washer to function as a grounding surface and a compression flange to create a leakproof, grounded connection comprising:

a molded connector body;

a metal ground washer having an integral tab protruding toward the center of said ground washer;

a ground wire welded to said tab;

said welded portion of said ground wire surrounded by said molded connector body; and

said ground washer interposed in said connector body and having an exposed outer surface for receiving a conductive fastener to be fastened thereon wherein upon securement of said conductive fastener, said connector is compressed into a mated condition and said ground wire is grounded to said conductive fastener.

**5,490,790**

## ELECTRIC VEHICLE CHARGING CONNECTOR ASSEMBLY

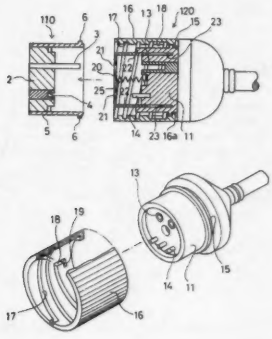
**Hajime Okada, Yokkaichi, Japan, assignor to Sumitomo Wiring Systems, Ltd., Mie, Japan**

**Filed Apr. 15, 1994, Ser. No. 228,272**

**Claims priority, application Japan, Apr. 19, 1993, 5-116340**

**Int. Cl.[6] H01R** *13/625*

**U.S. Cl. 439—141** **4 Claims**



**1**. An electric vehicle charging connector assembly for use in externally charging a power battery provided in a body of an electric vehicle, thereby powering the electric vehicle, the connector assembly comprising:

a) a vehicle side connector body provided on the body of the electric vehicle;

b) vehicle side power terminals disposed in the vehicle side connector body, the vehicle side power terminals forming part of a charging power circuit for the power battery;

c) an external connector configured to be mated with and unmated from the vehicle side connector body, said external connector including an external connector body;

d) external power terminals disposed in the external connector body at positions at which the external power terminals will be electrically connected to the respective vehicle side power terminals;

e) a cam connecting mechanism provided on the vehicle side connector body and on the external connector body, the cam connecting mechanism including cam grooves integral with one of said vehicle side and external connector bodies, and cam projections receivable within the respective cam grooves and integral with the other of said vehicle side and external connector bodies;

f) clearance grooves contiguous to the respective cam grooves of the cam connecting mechanism so as to receive said cam projections, respectively, after said cam projections have moved beyond said cam grooves as said connector bodies are being mated together, each of said clearance grooves extending longitudinally from one of said cam grooves in a first direction parallel to the directions in which the connector bodies move toward each other when the connector bodies are being mated together, said connector bodies reaching a final mating position after said cam projections have been slid along said clearance grooves;

g) lock means for holding said connector bodies together when said connector bodies are in said final mating position; and

h) a return spring provided in one of said vehicle side connector body and said external connector at a position at which the spring will urge said connector bodies apart when said connector bodies are mated together, the return spring urging said connector bodies in directions in which the cam projections receive a force acting in a direction opposite to said first direction, in which said clearance grooves extend from said cam grooves, when the cam projections are received within the respective clearance grooves, whereby said cam projections will be moved relatively back toward said cam grooves by said return spring unless said locking means is put into effect.

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**5,490,791**

## CARD EDGE CONNECTORS

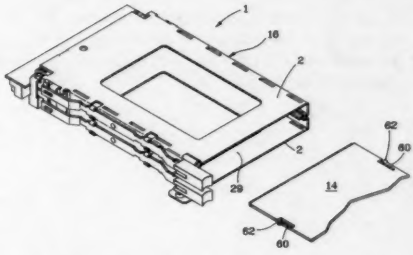
**Shoji Yamada, Machida, and Yoshitsugu Fujiura, Tokyo, both of, Japan, assignors to The Whitaker Corporation, Wilmington, Del.**

**Filed Oct. 26, 1993, Ser. No. 143,409**

**Claims priority, application Japan, Dec. 28, 1992, 4-092948 U**

**Int. Cl.[6] H01R** *13/635;* **H05K** *7/10*

**U.S. Cl. 439—159** **16 Claims**



**1**. A card edge connector for use with an electrical circuit, comprising:

a main body portion having two frame portions which are joined together to form a main cavity in the main body, said main body portion has first and second operating members joined to a side thereof and joined to an ejecting device for operatively ejecting a pair of cards from the main cavity;

said main body further including electrical contacts at one end of the main cavity for connection to said electrical circuit, and an opening at the other end of the main cavity for receiving said cards; and

wherein a removable partition is provided between the frame portions thereby forming two smaller cavities for receiving said cards, the partition being removably inserted through said opening.

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**5,490,792**

## MULTI-LEVEL MEMORY CARD CONNECTOR

**Naoki Sugita, Kawasaki, Japan, assignor to Kel Corporation, Tokyo, Japan**

**Filed Nov. 12, 1993, Ser. No. 150,473**

**Claims priority, application Japan, Nov. 18, 1992, 4-085493 U**

**Int. Cl.[6] H01R** *13/62*

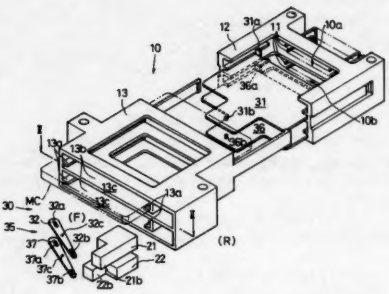
**U.S. Cl. 439—159** **3 Claims**

**1**. A multi-level memory card connector comprising:

frame means defining a plurality of memory card receiving compartments located adjacent each other extending horizontally and in vertical alignment at upper and lower levels and having respective horizontally elongate memory card receiving mouths opening at a common insertion face;

a plurality of ejection means for ejecting respective memory cards from respective compartments and mounted in the frame means to extend at adjacent locations which locations are laterally adjacent respective compartments and in vertical alignment with each other;

a plurality of ejection buttons for actuating respective ejection means and mounted on the insertion face at adjacent locations at respective levels laterally of respective mouths, the ejection buttons having respective free ends with respective finger-



engageable portions exposed at the insertion face at locations adjacent respective adjacent longitudinal ends of respective mouths and laterally offset from each other so that they extend obliquely of the vertical.

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**5,490,793**

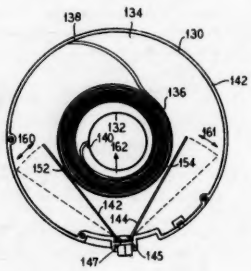
## AUTOMOBILE CLOCKSPRING WITH VIBRATION DAMPENER

**Patrick A. Bolen, Carthage, Ill., assignor to Methode Electronics, Inc., Chicago, Ill.**

**Continuation-in-part of Ser. No. 209,967, Mar. 11, 1994. This application Aug. 3, 1994, Ser. No. 285,072**

**Int. Cl.[6] H01R** *35/04*

**U.S. Cl. 439—164** **8 Claims**



1. A clockspring interconnector comprising:

a housing having a housing wall;

said housing wall defining a chamber;

a rotor hub attached to said housing;

a flat conductor cable coiled within said chamber having a first end and second end;

said first end attached to said rotor hub;

said second end attached to said housing; and a vibration dampener attached to said housing and compressing said flat conductor cable including a first arm and second arm which provide inward compression of the flat conductor cable in a single, lateral direction and also inwardly toward said rotor hub, said first arm and said second arm joined at a base portion which is mounted to said housing via a post.

**5,490,794**

## BRANCH JOINT BOX

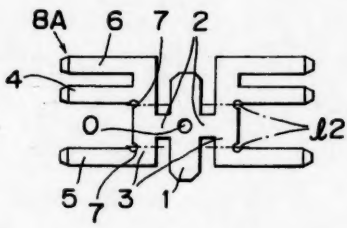
**Makoto Kobayashi; Tsutomu Naitou, and Kazunori Kurata, all of Yokkaichi, Japan, assignors to Sumitomo Wiring Systems, Ltd., Yokkaichi, Japan**

**Filed Oct. 27, 1994, Ser. No. 329,827**

**Claims priority, application Japan, Nov. 5, 1993, 5-277066; Feb. 17, 1994, 6-020574**

**Int. Cl.[6] H01R** *9/24*

**U.S. Cl. 439—212** **11 Claims**



1. A bus bar blank formed of an electrically conductive metal plate, comprising:

an elongated carrier having a longitudinal direction;

a plurality of pairs of opposite coupling portions, each pair extending perpendicularly from respective opposite sides of the carrier at a predetermined interval in the longitudinal direction of the carrier;

a pair of opposite connecting portions, each having a predetermined length and extending from respective distal ends end of each of the pairs of the opposite coupling portions in parallel with the longitudinal direction of the carrier;

a pair of opposite first terminal portions which extend perpendicularly from respective opposite connecting portions of each pair thereof;

a pair of opposite second terminal portions which extend perpendicularly from respective opposite connecting portions of each pair thereof, such that the first and second terminal portions are disposed symmetrically with respect to a center of the respective coupling portions; and

a pair of opposite third terminal portions which extend perpendicularly from respective opposite connecting portions, of each pair thereof at a location outside the respective first and second terminal portions and spaced a predetermined distance from at least one of the first and second terminal portions and spaced the predetermined distance from the respective first and second terminal portions;

wherein the bus bar blank includes a plurality of bus bar sets each including a pair of .the opposite coupling portions, a pair of the opposite connecting portions and a pair of the opposite first, second and third terminal portions;

wherein at a boundary of neighboring bus bar sets, a first boundary of one of the first, second and third terminal portions of one of the neighboring bus bar sets lies next to an opposed boundary of one of the first, second and third terminal portions of the other of the neighboring bus bar sets and a gap is formed between the first boundary and the opposed boundary of the first, second and third terminal portions, such that a bus bar is formed from one of the bus bar sets or a plurality of the bus bar sets by cutting the carrier; and

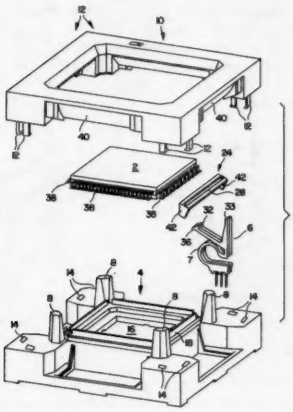
wherein by cutting off an unnecessary one of the first, second and third terminal portions from the bus bar, a bus bar of a different pattern, can be formed.

**5,490,795**

## ALIGNING IC SOCKET

**Kurt C. Hetzel, Phoenix; Jeffery A. Farnsworth, Scottsdale, and Patrick H. Harper, Phoenix, all of Ariz., assignors to Precision Connector Designs, Inc., Peabody, Mass.**

**Filed Jun. 16, 1994, Ser. No. 260,517**
**Int. Cl.[6] H01R** *11/22*
**U.S. Cl. 439—266** **4 Claims**



**1**. A socket for ICs comprising:

(a) a base with a cavity that accepts an IC package with leads extending away from said package in a first direction for a distance and there said leads are bent and extend at about ninety degrees from said first direction, said leads defining rows, each said row having a length with remote ends,

(b) a plurality of contacts constructed and arranged within the base, said contacts, formed in rows matching said lead rows and having extensions for making electrical connections to said leads,

(c) a discrete alignment bar that extends along the length of each lead row, and aligns each contact with a respective lead said bar having ears that matingly overlap the remote ends of said row of leads,

(d) a rail of said base that fits between the bent portion of said leads and the package, said rail extending along said length of said row of leads, and said rail contacting said leads adjacent to the package to support the leads as the socket contacts make physical and electrical connections to said leads, said rail having a first and a second end constructed to mate with said ears.

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**5,490,796**

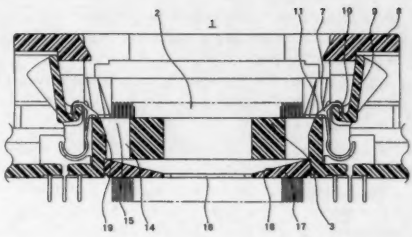
## IC SOCKET EQUIPPED WITH DUST DISCHARGE MEANS

**Ryuichi Nakamura, Kawasaki, and Kazunori Nakano, Tokyo, both of, Japan, assignors to Yamaichi Electronics Co., Ltd., Tokyo, Japan**

**Filed Oct. 18, 1994, Ser. No. 324,666**
**Claims priority, application Japan, Jan. 18, 1993, 5-284009**
**Int. Cl.[6] H01R** *11/22*
**U.S. Cl. 439—266** **18 Claims**

**1**. An IC socket comprising:

an IC socket body having an IC receiving portion for receiving an IC package, and a pedestal provided at a lower portion of said IC receiving portion, said IC receiving portion including an IC body receiving portion for receiving an IC body of the IC package, said pedestal having an IC lead supporting surface located outwardly from said IC body receiving portion for supporting IC leads of said IC package;



a plurality of contacts mounted to said IC socket body for respectively pressing against the IC leads to create electrical connections when said IC package is received in said IC receiving portion and said IC leads are supported on said IC lead supporting surface; and

wherein a dust discharge opening is formed in said pedestal through said IC lead supporting surface thereof, said dust discharge opening having an edge portion which contacts the IC leads of the IC package when the IC body is received in said IC body receiving portion and the IC leads are supported on said IC lead supporting surface.

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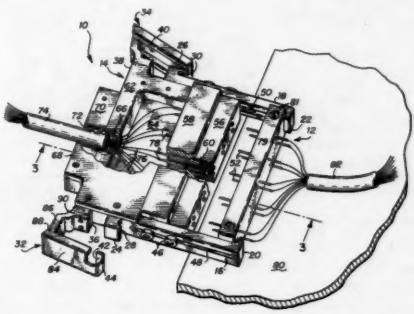
**5,490,797**

## MULTIPIN CONNECTOR APPARATUS

**Bruce I. Durgin, 4825 Tampico Way, San Jose, Calif. 95118**

**Filed Jan. 21, 1994, Ser. No. 184,672**
**Int. Cl.[6] H01R** *13/62*
**U.S. Cl. 439—310** **23 Claims**



**1**. A multipin connector assembly comprising:

a first connector assembly including

a first plurality of electrically conductive contact pins,

a first connector body for insulatively supporting said contact pins, and

means for mounting said first connector assembly on a surface; and

a second connector assembly including a second connector body having a plurality of contactors each including

an electrically conductive element with a contact surface forming a first end for making contact with one of the contact pins,

spring loading means for providing a spring force resisting motion of said element when said element is pressured on said first end, and

wire interconnection means for electrically interconnecting a wire to said element,

a plurality of receptacles formed within said second body, each said receptacle containing one of the contactors and a means for guiding one of the contact pins to the contactor contained in the receptacle, and

a rear housing assembly for receiving a cable assembly and for containing cable wires for connection with said interconnection means, and

clamp means attached to said second body having means for gripping said first connector body and configured so that upon gripping said first connector body, and user activation of said clamp means, a leveraged force is exerted thrusting said second body towards said first connector body so as to cause said contact pins to be inserted in said receptacles and to make contact with said contactors.

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**5,490,798**

**CONNECTOR EXAMINING DEVICE**

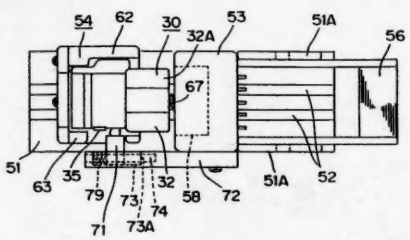
**Makoto Murakami, Kanazawa; Michimasa Noro, Matsuzaka, and Takao Ito, Matsuzaka, all of, Japan, assignors to Sumitomo Wiring Systems, Ltd., Mie, Japan**

**Division of Ser. No. 114,087, Aug. 31, 1993, Pat. No. 5,429,519. This application Mar. 2, 1995, Ser. No. 397,764**

**Claims priority, application Japan, Sep. 3, 1992, 4-236142**

**Int. Cl.[6] H01R** *13/62*

**U.S. Cl. 439—310** **5 Claims**




1. A connector examining device used to check an electrical connector which has an engagement member that is temporarily engaged with a housing of the connector and is pushable into the housing, whereby the engagement member and a terminal within the housing are engaged with each other to attach the terminal to the housing, said examining device comprising

a connector receiving portion for holding the connector to be checked,

a detector portion located in opposition to said connector receiving portion and having a detector which corresponds to the terminal of the connector to be checked and which protrudes toward said connector receiving portion,

base means for holding said connector receiving portion and said detector portion so that they can be relatively displaced with respect to each other in a direction of extension of said detector,

a pusher that is attached to said detector portion and comes in contact with the engagement member of the connector held by said connector receiving portion, said pusher being displaced relative to said connector receiving portion to push the engagement member into the housing when said connector receiving portion and said detector portion are in a position relatively close to each other and after the terminal is in contact with said detector.

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**5,490,799**

**CONNECTOR ASSEMBLY WITH ASSOCIATION INDICATOR**

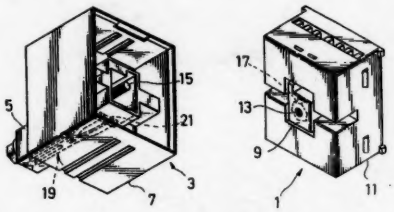
**Masayuki Yamamoto, Shizuoka, Japan, assignor to Yazaki Corporation, Tokyo, Japan**

**Filed Mar. 9, 1994, Ser. No. 207,635**

**Claims priority, application Japan, Mar. 9, 1993, 5-047819**

**Int. Cl.[6] H01R** *9/00*

**U.S. Cl. 439—489** **20 Claims**




1. An association indicator for a connector assembly comprising a pair of male and female connector housings, in which at least a pair of electrical terminals are separately provided on each of the male and female connector housings and the male connector housing is adapted for insertion into the female connector housing so as to make electrical connection by association of said pair of electric terminals, the association indicator, for indicating association of said pair of electrical terminals comprising:

an indicator opening provided in the female connector housing;

a movable member having an indicator member at a forward end thereof and being movably arranged inside the female connector housing;

means for moving the movable member during insertion of the male connector housing into the female connector housing;

means for guiding the indicator member to the indicator opening as the movable member is moved, in such a manner that the indicator member appears in the indicator opening only when said pair of electrical terminals are mated; and

prevention means for absorbing an excessive force applied to the movable member, the prevention means extending from the movable member at a rear end thereof and engaging with the female connector housing, preventing the indicator member from being inserted into the indicator opening past a predetermined position in the indicator opening.

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**5,490,800**

**ELECTRICAL CONNECTOR**

**Kevin C. Benes, Willowbrook; Stephen A. Colleran, Lisle; Robert J. Gugelmeyer, Naperville, and Thomas G. Premo, Downers Grove, all of Ill., assignors to Molex Incorporated, Lisle, Ill.**

**Filed Jul. 11, 1994, Ser. No. 273,578**

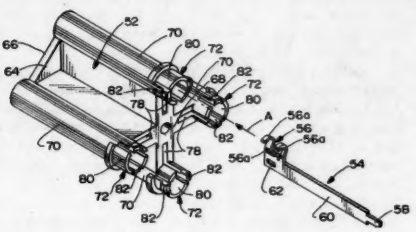
**Int. Cl.[6] H01R** *13/73*

**U.S. Cl. 439—567** **16 Claims**

15. An electrical connector for mating with a complementary electrical device that includes a plurality of projecting terminal pins, comprising:

a plurality of terminals each having a receptacle portion for receiving one of said terminal pins of the complementary electrical device; and

a dielectric housing having a mating face and a mounting face with a plurality of through terminal-receiving passages extending between the faces, each passage including a cavity



portion for receiving the receptacle portion of one of the terminals, and a plurality of mounting pegs for insertion into mounting holes in a substrate, each mounting peg being generally hollow and forming a continuation of one of the through terminal-receiving passages, said mounting pegs being in line with the cavity portions of said passages, each mounting peg including a guiding portion for guiding the peg into a respective one of the mounting holes in the substrate and a resilient latch portion for latching engagement with the substrate.

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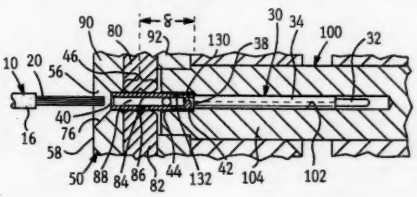
**5,490,801**

## ELECTRICAL TERMINAL TO BE CRIMPED TO A COAXIAL CABLE CONDUCTOR, AND CRIMPED COAXIAL CONNECTION THEREOF

**Robert L. Fisher, Jr., Palmyra, and Robert C. Hosler, Sr., Marysville, both of Pa., assignors to The Whitaker Corporation, Wilmington, Del.**

**Division of Ser. No. 988,087, Dec. 4, 1992, Pat. No. 5,273,458.**
**This application Nov. 9, 1993, Ser. No. 151,458**
**Int. Cl.[6] H01R** *9/05*
**U.S. Cl. 439—585** **2 Claims**



1. An electrical terminal for use in crimp termination to an inner conductor of a coaxial cable and having a conductor-receiving barrel at a rearward end, a contact section at a forward end for mating with a complementary contact section of a complementary terminal at a known axial location along said contact section, and further having a body section between the contact section and the conductor-receiving barrel; and

said terminal including on a forward end of said conductor-receiving barrel of said terminal forwardly of a crimping region thereof, an intermediate section of selected outer diameter different from the diameter of said conductor-receiving barrel and greater than that of said body section of said terminal, and having a selected axial length and selected position adjacent said body section; and

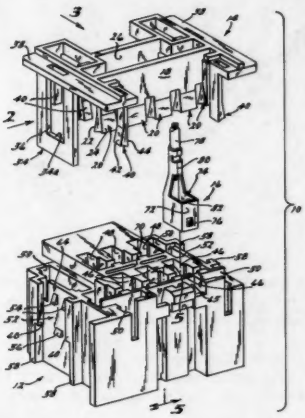
said terminal being free of projections and other sections of varying diameter, for generating a deliberate impedance mismatch thereat during in-service use after being crimped to an end of an inner conductor of a coaxial cable and disposed within a coaxial connector.

**5,490,802**

## SECONDARY TERMINAL LOCK PLUG THROUGH STUFFER

**Robert G. Plyler, Vienna, Ohio; Terry A. Rice, Canton, and Chong H. Yi, Deaborn, both of Mich., assignors to United Technologies Automotive, Inc., Dearborn, Mich.**

**Filed Feb. 24, 1994, Ser. No. 201,217**
**Int. Cl.[6] H01R** *13/436*
**U.S. Cl. 439—752** **20 Claims**



1. An electrical connector assembly comprising:

a connector body having at least first and second openings adapted to receive first and second terminal members therein which are oriented substantially normal to one another, said connector body including at least first and second wall portions and ramps on said wall portions; and

a terminal stuffer member adapted to interengage with said connector body for securing said terminal members within said openings, said terminal stuffer member including an integrally formed planar wall portion having a first flexible arm member formed integrally therewith and protruding therefrom, said first flexible arm member being adapted to be urged into abutting engagement with said first terminal member when said first terminal member is disposed within said opening in said connector body and said terminal stuffer means is operably engaged with said connector body;

said terminal stuffer member including a second flexible arm member protruding therefrom and oriented substantially normal with respect to said first arm member, said second arm member being flexible and being adapted to be urged into abutting engagement with said second terminal member;

whereby interengagement of said terminal stuffer member with said connector body when said first and second terminal members are disposed within said opening in said connector body causes said flexible arm members to be urged by said ramp into abutting engagement with said terminal members, to thereby lockably secure said terminal members within said connector body; and

whereby said terminal stuffer member may be interengaged with said connector body in a preloaded position in which said flexible arm member does not interfere with insertion of said terminal members into said openings.

**5,490,803**

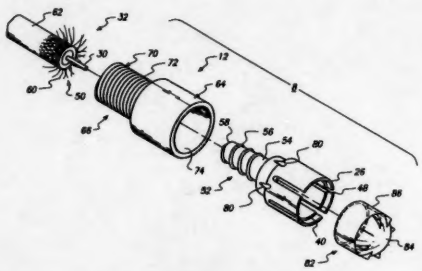
## COAXIAL CABLE CONNECTION METHOD AND DEVICE USING OXIDE INHIBITING SEALANT

**Corey McMills, Los Altos, and John Mattis, Sunnyvale, both of Calif., assignors to Raychem Corporation, Menlo Park, Calif.**

**Continuation of Ser. No. 981,974, Nov. 25, 1992, Pat. No. 5,362,250. This application Nov. 8, 1994, Ser. No. 335,602**

**Int. Cl.[6] H01R** *13/52*

**U.S. Cl. 439—276** **5 Claims**



1. A method of connecting the termini of two or more coaxial cables wherein the coaxial cables each have a central axial conductor and an outer concentric conductor, the method comprising the steps of:

(a) coating each of the concentric conductors with an oxide abrasive sealant, the sealant has a viscosity at 68° F. of at least about 1000 cps and includes beads selected from the group consisting of glass, sand, silica, or mixtures thereof and wherein the beads have a diameter range between about 0.00001 inches to about 0.002 inches;

(b) connecting the central conductors to one another; and

(c) connecting the concentric conductors to one another;

wherein the sealant is sufficiently abrasive to remove oxides from the conductors but not so abrasive so as to do significant damage to the conductors.

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**5,490,804**

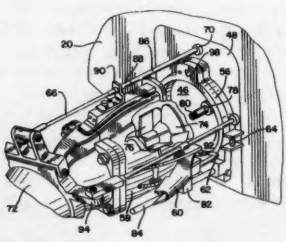
## MARINE PROPULSION UNIT HAVING EXTERIORLY ACCESSIBLE CLEAN-OUT CAPABILITY AND FLUSHING DEVICE FOR SAME

**Clarence E. Blanchard; Duane E. Rogers, both of Kenosha, both of Wis.; Charles B. Hall, Ingleside, Ill.; Robert Mooney, Oak Creek; W. Scott Craig, Kenosha, both of Wis., and Dean P. Bergman, Waukegan, Ill., assignors to Outboard Marine Corporation, Waukegan, Ill.**

**Continuation of Ser. No. 147,976, Nov. 5, 1993, abandoned. This application Sep. 27, 1994, Ser. No. 313,538**

**Int. Cl.[6] B63H** *11/00*

**U.S. Cl. 440—38** **25 Claims**



1. A jet propulsion unit for a marine craft, comprising:

a power head for powering the unit, said power head having an output drive shaft;

impeller means for driving water through the unit for propelling the marine craft;

a water inlet housing providing a mounting structure for mounting said power head thereto;

said impeller means including an impeller housing having a passage therein and an rotatable impeller mounted to said housing and located within said passage, said impeller housing being connected to said water inlet housing, said water inlet housing having an intake passage for receiving water from adjacent the unit, said intake passage being in communication with said impeller housing passage;

a direction controlling outlet nozzle means attached to the rear portion of said impeller housing, said nozzle means being adapted to adjustably control the direction of the water being expelled from the unit during operation;

said impeller being releasably connected to said power head, at least a moveable portion of said impeller housing being reciprocally moveable and releasably clamped relative to said water inlet housing so that the interior of said impeller housing is accessible from the outside of the unit without requiring disassembly of said unit; and

said moveable portion of said impeller housing is slidably connected to a remaining portion thereof remaining attached to said water inlet housing, so that said moveable portion can be linearly displaced from said remaining portion which being retained thereto, said impeller separating from connection to said power head as said portion is linearly displaced, thereby exposing said impeller and permitting cleaning of debris from the interior of said impeller housing and said impeller.

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**5,490,805**

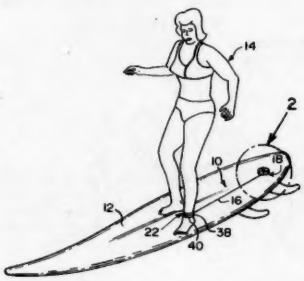
## RETRACTABLE SURFBOARD LEASH

**Carl S. Bredesen, 272 Akiohala St., Kailua, Hi. 96734**

**Filed Oct. 13, 1994, Ser. No. 322,692**

**Int. Cl.[6] A63C** *15/06*

**U.S. Cl. 441—75** **5 Claims**



1. An improved retractable leash for attaching a surfboard to a surfer, said leash comprising:

a) an elongated line;

b) a storage unit for said line, said storage unit including a housing having a side aperture, and a spool rotatively carried within said housing to allow said line to pass through said aperture in said housing and wrap about said spool;

c) means for mounting said storage unit onto the surfboard and allowing said storage unit to rotate three hundred and sixty degrees, said mounting means including an anchor nut embedded into a top surface of said surfboard, and a bolt having a threaded shank which extends centrally through said housing, through said spool and threadably engages with said anchor nut, thereby allowing said housing to rotate three hundred and sixty degrees;

d) means for attaching a free end of said line to the surfer, so that when the surfer falls off the surfboard in any direction said line will pull out more directly from said storage unit, said attaching means is a cuff which fits about an ankle of the surfer; and

e) means for retracting said line into said storage unit, so that the slack of said line is taken up to eliminate long line drag in the water as the surfer rides the surfboard on the waves, said retracting means including a spring biasing assembly coupled between said housing and said spool, so as to cause rotation of said spool within said housing to normally pull said line back upon said spool, said housing being cylindrical shaped having a perforated top surface and an opened bottom to allow water to enter therein and exit therefrom to lubricate said spool.

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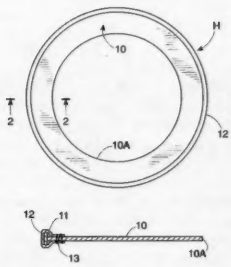
**5,490,806**
**TOY HOOP**
**Donald Spector, 380 Mountain Rd., Union City, N.J. 07080**
**Filed Aug. 9, 1994, Ser. No. 287,925**
**Int. Cl.[6] A63H** *18/00*
**U.S. Cl. 446—48** **5 Claims**




1. A toy hoop which in a relatively small diameter operates in a flying ring mode to spin in the air, and in a larger diameter operates as a Hula-Hoop, said hoop comprising:

A. a planar annulus formed of non-stretchable, non-woven fabric sheeting of uniform thickness impermeable to air having an outer circular periphery and an inner circular periphery having a soft edge of the same thickness as the sheeting; and

B. a ring formed of highly deformable spring metal concentric with the outer periphery of the annulus and joined thereto, said inner circular periphery being free whereby said ring is twistable 360 degrees to collapse the hoop into an endless coil having three intermeshing convolutions to provide a compact structure when the hoop is not in use, said annulus in the flying ring mode, when the hoop is launched by a player, functioning as an air foil, and in the Hula-Hoop mode when the hoop surrounds a player, as a protective crushable inner liner.

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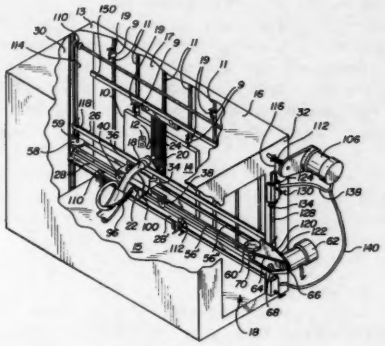
**5,490,807**
**SAND-BLAST SIGN-MAKING APPARATUS**
**Ted Marchell, 4 Hall Rd., Ithaca, N.Y. 14850**
**Filed Oct. 27, 1993, Ser. No. 141,528**
**Int. Cl.[6] B24C** *3/04*
**U.S. Cl. 451—3** **22 Claims**

1. An apparatus for making signs from a blank of degradable material having a substantially planar front surface; a removable, non-degradable stencil affixed to said blank front surface; and a sand-blast directed in a stream through a nozzle to impinge upon said blank front surface whereby said sand-blast degrades the portions of said blank front surface surrounding said stencil, said apparatus comprising:

a) a carriage assembly supporting and directing said nozzle at said blank front surface;

b) means moving said carriage with said nozzle in a first plane spaced and parallel to said front surface of said blank; and

c) sand-blast divider means comprising a grille having a plurality of horizontally extending, vertically spaced elongated members positioned in a second plane spaced between said



nozzle and said blank, said second plane lying parallel to said first plane and said blank front surface, the distance between said grille and said blank being adjustable, said sand-blast divider means operable to divide said sand-blast stream into at least two vertically spaced, sand-blast streams whereby said sand-blast streams degrade and form a plurality of vertically spaced, parallel grooves in said portion of said blank front surface surrounding said stencil.

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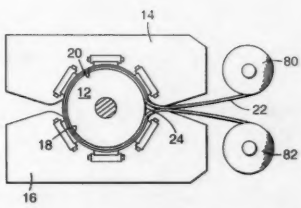
**5,490,808**
**ABRASIVE ATTACHMENT SYSTEM FOR ROTATIVE ABRADING APPLICATIONS**
**Robert J. Jantschek, Stillwater, Minn.; Forrest J. Rouser, San Rafael, Calif.; Mark L. Sterner, Mahtomedi, and Theodore J. Testen, St. Paul, both of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.**
**Continuation of Ser. No. 10,680, Jan. 28, 1993, abandoned. This application Jan. 30, 1995, Ser. No. 380,239**
**Int. Cl.[6] B24B** *5/42*
**U.S. Cl. 451—59** **12 Claims**




1. An apparatus for abrading an outer peripheral surface of a workpiece, comprising:

(a) an abrasive tape including an abrasive face and an opposed back face including a first microstructured surface defining a first plane;

(b) support means including a rigid pressure face for supporting said abrasive tape thereon and for urging said abrasive tape against the workpiece, said pressure face having mounted thereon a resilient layer conformable to the pressure face, the resilient layer including a second microstructured surface defining a second plane;

wherein said first microstructured surface comprises a first plurality of tapered elements and said second microstructured surface comprises a second plurality of tapered elements, said tapered elements including sides inclined relative to said planes of said microstructured surfaces and being configured such that when said first plurality of tapered elements is in intermeshing engagement with said second plurality of tapered elements, frictional forces between said sides of said

first plurality of tapered elements and said sides of said second plurality of tapered elements maintain said tapered elements in intermeshing engagement so as to prevent relative movement between said abrasive tape and said pressure face in response to shear forces induced during abrading; and

(c) means for rotating one of the workpiece and the support means relative to the other of the workpiece and the support means;

whereby said abrasive face abrades material from the outer peripheral surface of the workpiece during relative rotation between the workpiece and said support means.

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**5,490,809**

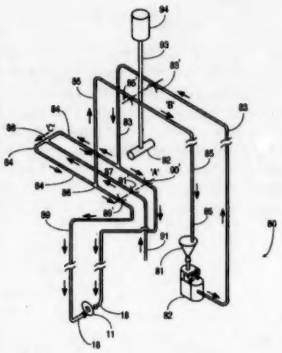
## SYSTEM AND METHOD FOR TEXTURING MAGNETIC DATA STORAGE DISKS

**Oliver D. Jones, Santa Cruz, and Donald E. Stephens, Westlake Village, both of Calif., assignors to Oliver Design, Inc., Scotts Valley, Calif.**

**Division of Ser. No. 842,695, Feb. 27, 1992. This application Apr. 28, 1994, Ser. No. 234,778**

**Int. Cl.[6] B24B** *57/02*

**U.S. Cl. 451—60** **10 Claims**



**1**. A system for delivering a preselected amount of a slurry, said system comprising:

a slurry reservoir;

a pump;

a slurry recirculation loop comprising outflow and return lines and a dispense section, said dispense section being bounded on either end by a dispense aperture;

means for alternately allowing or preventing flow in both of said outflow and return lines; and

means for admitting a gas to said dispense section so as to expel said slurry through said dispense apertures while flow is prevented in said outflow and return sections.

**10**. A method of delivering a preselected amount of a slurry, said method comprising:

providing a slurry recirculation loop and a pair of dispense lines extending from first and second points along said recirculation loop, said first and second points defining a dispense section of said loop;

recirculating a slurry in said loop;

causing said recirculation to terminate in said dispense section of said loop; and

injecting a gas into said dispense section so as to expel the slurry in said dispense section through said dispense lines.

**5,490,810**

## PROCESS AND DEVICE FOR MANUFACTURING A STRUCTURAL PART, ESPECIALLY OF A CERAMIC TOOTH RESTORATION, AND A PROCESS OF MAKING SONOTRODE CROWNS

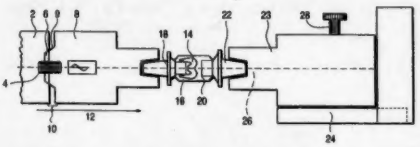
**Rainer Hahn, Rottenburg, and Bernd Burger, Alling, both of, Germany, assignors to Thera Patent GmbH & Co. KG Gesellschaft Für Industrielle Schutzrechte, Seefeld, Germany**

**Filed Sep. 24, 1993, Ser. No. 126,208**

**Claims priority, application Germany, Sep. 24, 1992, 42 32 023.3**

**Int. Cl.[6] B24B** *1/00*

**U.S. Cl. 451—165** **17 Claims**



**1**. Process of machining a workpiece by means of an ultrasonic machining apparatus, in which a receiver for a profiled sonotrode crown is positioned on each side of the workpiece to be worked, the receiver being in opposing relation to one another, comprising

(a) in a first machining step, holding said workpiece by a workpiece holder activating a first sonotrode crown through its receiver and machining one of the workpiece halves to the desired shape, said sonotrode crown thereby being brought into form-fitting engagement with said workpiece; and

(b) in a second machining step, holding said workpiece by said first, now passive, sonotrode crown by means of said form-fitting engagement, activating a second sonotrode crown and machining the remaining half of the workpiece to the desired shape, characterised in that

(c) between said two machining steps

(c1) said first sonotrode crown is exchanged with said second sonotrode crown and attached to the opposing receiver;

(c2) both sonotrode crowns are aligned with respect to one another for continuing the machining of said workpiece;

(c3) wherein said workpiece is held in said form-fitting engagement or is again brought into said form-fitting engagement with said first sonotrode crown.

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**5,490,811**

## APPARATUS FOR CHAMFERING NOTCH OF WAFER

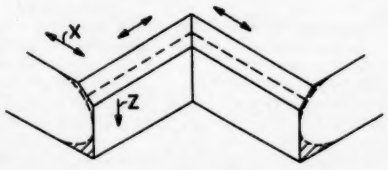
**Kaoru Hosokawa, Saitama, Japan, assignor to Shin-Etsu Handotai Co., Ltd., Tokyo, Japan**

**Continuation-in-part of Ser. No. 897,038, Jun. 11, 1992, Pat. No. 5,271,185. This application Jun. 2, 1993, Ser. No. 70,623**

**Claims priority, application Japan, Jun. 12, 1991, 3-167753**

**Int. Cl.[6] B24B** *9/06*

**U.S. Cl. 451—239** **5 Claims**




**1**. An apparatus for chamfering a notch of a wafer by means of a profiling and grinding mechanism comprising:

a holding and rotation mechanism having a cylindrical part rotatable within a predetermined range of angle about its

rotational axis perpendicular to a main surface of a wafer which can be mounted on a top surface of the cylindrical part by means of a first drive mechanism, said cylindrical part being coaxially provided with a reference plate having a chamfering guide surface at its peripheral edge which is located at a certain distance from an upper end of the cylindrical part, the wafer to be treated being fixed by vacuum attraction at an upper end of the cylindrical part;

a chamfering device comprising a motor, a disc-shaped grindstone rotated by means of the motor and a disc having a same diameter and a same thickness as the grindstone, the grindstone and the disc being arranged in a same plane in order that a line connecting center points of same side surfaces of the grindstone and the disc is parallel to the rotational axis of the cylindrical part and that the distance between center points of the grindstone and the disc is equal to the distance between upper surfaces of a wafer and a reference plate mounted on the cylindrical part;

a second drive mechanism for moving the holding and wafer rotation mechanism relative to the grindstone in a radial direction of the grindstone;

a third drive mechanism for moving the holding and rotation mechanism relative to the grindstone in a direction of thickness of a wafer on the holding and rotation mechanism; and

a positioning mechanism for controlling the first and third mechanisms in order to relatively move the disc in contact with a chamfering guide surface so that, at the same time, the grindstone comes in contact with the notch of the wafer in order to chamfer the notch in accordance with the motion of the disc relative to the chamfering guide surface, and to duplicate the geometry of the chamfering guide surface on the notch.

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**5,490,812**

## BONING DEVICE AND METHOD

**Martin Schaarschmidt, Warendorf, Germany, assignor to Schaartec GmbH & Co. KG, Warendorf, Germany**

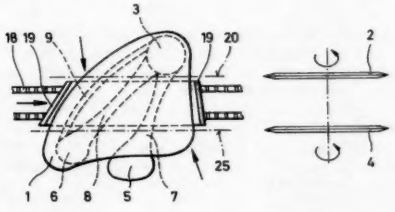
**PCT No. PCT/EP93/02922, § 371 Date Oct. 3, 1994, § 102(e) Date Oct. 3, 1994, PCT Pub. No. WO94/09634, PCT Pub. Date May 11, 1994**

**Continuation-in-part of Ser. No. 4,977, Jan. 15, 1993. This PCT application Oct. 10, 1993, Ser. No. 256,300**

**Claims priority, application European Pat. Off., Jan. 23, 1992, 92118133**

**Int. Cl.[6] A22C** *17/04*

**U.S. Cl. 452—138** **20 Claims**




1. A device for boning limbs of animals having bones similar in strength and orientation to poultry bones, the limbs having two ends with a center joint between the ends, comprising:

a holding means for holding said limbs adjacent said joint and adjacent said ends of said limbs;

a first saw cutting means for separating said center joint of said limbs held in said holding means;

a second saw cutting means for separating said end joints of said limbs held in said holding means; and

an ejector device for ejecting the bones, after said center and end joints are separated, by pushing said bones out of said limbs while said limbs are held in said holding means.

**5,490,813**

## AIR INJECTION TUBE AND A METHOD FOR AIR INJECTION

**Frede Danielsen, Vejen, and Carsten Jespersen, Aalborg, both of, Denmark, assignors to KE-Burgmann A/S, Vejen, Denmark**

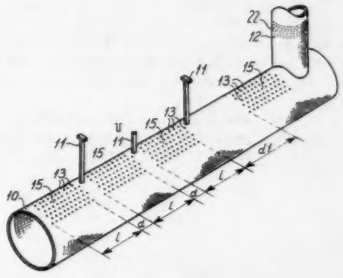
**PCT No. PCT/DK93/00037, § 371 Date Aug. 3, 1994, § 102(e) Date Aug. 3, 1994, PCT Pub. No. WO93/15366, PCT Pub. Date Aug. 5, 1993**

**PCT Filed Feb. 2, 1993, Ser. No. 256,738**

**Claims priority, application Denmark, Feb. 3, 1992, 127/92**

**Int. Cl.[6] F24F** *13/06*

**U.S. Cl. 454—306** **38 Claims**




1. An air injection tube for injecting ventilating, cooling and/or heating air into a room in which the tub is installed, a plurality of small, mutually spaced air injecting openings being defined in the peripheral wall of the tube along at least one longitudinally extending wall zone of the tube having a cross-sectional shape defining an arc of a circle, the openings of the zone being arranged in at least two peripherally spaced rows of openings and in predetermined groups or patterns, which are mutually spaced along a length of said zone, the longitudinal spacing of adjacent groups or patterns substantially exceeding the mutual longitudinal spacing of the openings in each group or pattern of openings, the maximum angular spacing of the air injection openings in peripherally adjacent rows of each group or pattern of openings being 45° each of the groups or patterns of air injection openings being spaced from the wall surfaces defining the room, whereby primary air flow exiting through the air injection openings of the axially spaced groups or patterns of openings induces a substantial increase in secondary flow of room air directed towards the air injection tube.

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**5,490,814**

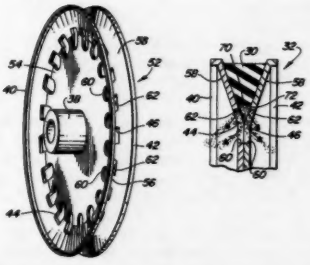
## POWER TRANSMISSION SHEAVE

**Donald R. Whitenight, Beaver Dam, Wis., assignor to Deere & Company, Moline, Ill.**

**Filed Apr. 26, 1995, Ser. No. 428,998**

**Int. Cl.[6] F16H** *57/00*

**U.S. Cl. 474—92** **11 Claims**




1. In a sheave having a central hub portion with a transversely extending axis of rotation,

first and second flanges carried by the hub portion and radially spaced outwardly therefrom, the flanges diverging from an apex to form a v-shaped groove around the circumference of the sheave that is adapted to receive a belt means, each flange having a portion spaced from the apex that engages the belt means, and

means facilitating the expulsion of foreign material from the groove including circumferentially spaced-apart openings carried in the sheave, the openings being adjacent to the flange portions and spaced radially inwardly therefrom.

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**5,490,815**

**FUEL-CUT CONTROL SYSTEM FOR AUTOMOBILES WITH LOCK-UP TYPE AUTOMATIC TRANSMISSION**

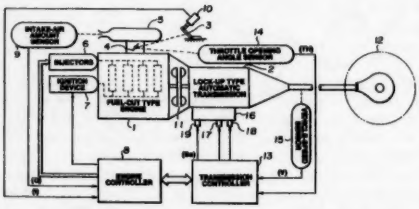
**Yuuji Kato, Sekiya, and Yoshichika Hagiwara, Sagamihara, both of, Japan, assignors to Nissan Motor Co., Ltd., Yokohama, Japan**

**Filed Mar. 4, 1994, Ser. No. 205,469**

**Claims priority, application Japan, Mar. 10, 1993, 5-049309**

**Int. Cl.[6] B60K** *41/02*

**U.S. Cl. 477—181** **4 Claims**



1. A fuel-cut control system for an automotive vehicle having an automatic transmission equipped with a lock-up torque converter which includes a lock-up clutch for connecting a crankshaft of a vehicle engine having a plurality of cylinders directly to the transmission output shaft in a lock-up range so as to transmit power from the engine to driven wheels of the vehicle through the torque converter which is conditioned in its locked-up state by engagement of the lock-up clutch during coasting, said system comprising:

a fuel-cut device for stopping fuel-supply to the engine; and

a step-by-step fuel recover means for cooperative with said fuel-cut device and responsive to transition of engine operation from coasting to acceleration running for stepwise recovering of each of the engine cylinders from fuel-cut in turn, while continuing the locked-up state of said torque converter in said lock-up range during said transition.

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**5,490,816**

**PACE GENERATING DEVICE**

**Kazumi Sakumoto, Chiba, Japan, assignor to Seiko Instruments Inc., Japan**

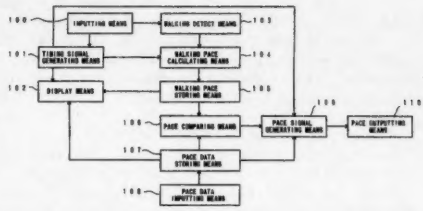
**Filed Feb. 17, 1994, Ser. No. 197,696**

**Claims priority, application Japan, Mar. 22, 1993, 5-062266**

**Int. Cl.[6] A63B** *21/00*

**U.S. Cl. 482—3** **14 Claims**

1. A pace generating device comprising: pace data storing means for storing predetermined pace data and generating a predetermined pace data signal; walking detector means for detecting the motion of walking and outputting a detection signal; walking pace calculating means for calculating a walking pace based on the detection signal from the walking detector means and outputting a walking pace signal; walking pace storing means for storing the walking pace signal and outputting a walking pace display signal corresponding to the walking pace signal; pace comparing means for comparing the walking pace signal stored in the walking pace storing means with the predetermined pace data signal stored in the



pace data storing means and outputting a pace generating instruction signal when the walking pace signal is out of a predetermined range; pace signal generating means for generating a pace signal from the predetermined pace data stored in the pace data storing means when the pace generating instruction signal is outputted from the pace comparing means; and pace outputting means for outputting a walking pace signal corresponding to the pace signal outputted by the pace signal generating means.

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**5,490,817**

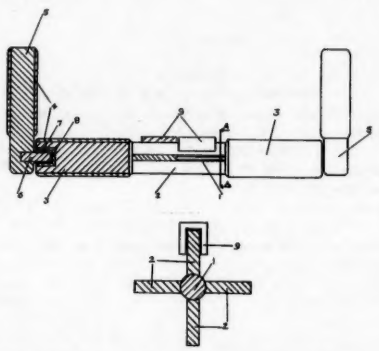
**WRIST ARM EXERCISER**

**Maxwell Stander, 11512 Taber St., Silver Spring, Md. 20902, and Radhakrishnan Chander, 1515 Jeff Davis Hwy. #203, Arlington, Va. 22202**

**Filed Dec. 30, 1994, Ser. No. 366,920**

**Int. Cl.[6] A63B** *23/14*

**U.S. Cl. 482—46** **4 Claims**



1. A portable hand-held exerciser comprising: an elongated bar, and a first pair of elongated handle means with gripping means located at the extremities of said elongated bar for rotation of said elongated bar about the longitudinal axis of said elongated bar; said elongated bar comprising a plurality of thin walled members extending radially from said elongated bar, attached to the periphery of said elongated bar to elastically offer resistance to rotation by one of said pair of elongated handle means of said elongated bar relative to the other about said longitudinal axis.

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**5,490,818**

**EXERCISE DEVICE WHICH SIMULATES CLIMBING A LADDER**

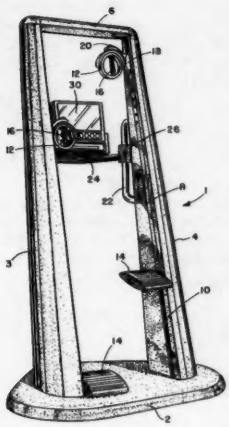
**Terry M. Haber, 25011 Castlewood, El Toro, Calif. 92630; William H. Smedley, 33285 Blanche Dr., Lake Elsinore, Calif. 92330, and Clark B. Foster, 23631 Wakefield Ct., Laguna Niguel, Calif. 92677**

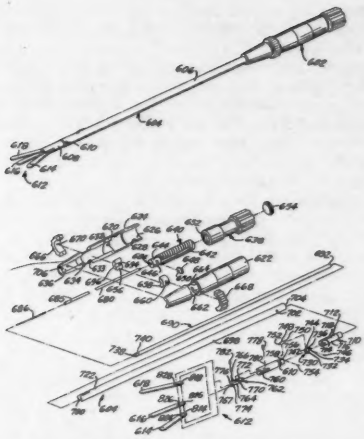
**Filed Jul. 14, 1994, Ser. No. 275,762**

**Int. Cl.[6] A63B** *23/04;22/04*

**U.S. Cl. 482—52** **16 Claims**

1. An exercise device to simulate climbing, comprising:





first and second guide rails extending in spaced, parallel alignment with one another,

a first carriage tube coupled to and slidable reciprocally over a first of said guide rails;

a second carriage tube coupled to and slidable reciprocally over the second of said guide rails;

a first hand grip and a first foot pedal rotatably attached to said first carriage tube and a second hand grip and a second foot pedal rotatably attached to said second carriage tube, said first and second hand grips and said first and second foot pedals applying successive pushing and pulling forces generated by a user of said exercise device to each of said first and second carriage tubes to cause said carriage tubes to slide reciprocally over respective ones of said first and second guide rails; and

linking means for interconnecting said first and second carriage tubes to one another in a continuous loop path so that said carriage tubes slide in opposite directions relative to one another in response to the pushing and pulling forces generated by the user and applied by said user contact means, said linking means including at least a first cable pulley and a first drive cable, said first drive cable extending from one end of said first carriage tube, around said first cable pulley, to one end of said second carriage tube, and at least a second cable pulley and a second drive cable, said second drive cable extending from an opposite end of said first carriage tube, around said second cable pulley, to the opposite end of said second carriage tube.

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**5,490,819**

**ARTICULATING ENDOSCOPIC SURGICAL APPARATUS**

**David A. Nicholas; Brian G. Russell, Norwalk, both of Conn.; Boris Zvenyatsky, Bronx, N.Y.; Paul A. Matula, Brookfield, Conn., and Stanley H. Remiszewski, Bolton, Mass., assignors to United States Surgical Corporation, Norwalk, Conn.**

**Continuation of Ser. No. 949,071, Sep. 22, 1992, abandoned, which is a continuation-in-part of Ser. No. 925,496, Sep. 4, 1992, abandoned, which is a continuation-in-part of Ser. No. 834,687, Feb. 12, 1992, Pat. No. 5,383,888, and a continuation-in-part of Ser. No. 874,743, Apr. 27, 1992, Pat. No. 5,381,788, which is a continuation-in-part of Ser. No. 740,443, Aug. 5, 1991, Pat. No. 5,199,419. This application Sep. 2, 1994, Ser. No. 300,700**

**Int. Cl.[6] A61B** *17/02*

**U.S. Cl. 600—201** **33 Claims**

**1**. A surgical apparatus comprising:

a) a handle portion defining a first longitudinal axis;

b) a tubular body extending from said handle portion including an elongated portion having a second longitudinal axis extending therethrough in axial alignment with said first longitudinal axis, and a distal portion articulatable relative to said second longitudinal axis of said elongated portion;

c) a retractor assembly operatively associated with said distal portion and including a plurality of interleaved retractor blades;

d) means including an elongated rod member associated with said handle portion and disposed at least partially within said tubular body for moving said plurality of retractor blades between an open position and a closed position, one of said plurality of interleaved retractor blades mounted to a distal end portion of said elongated rod member; and

e) means associated with said handle portion and said tubular body for progressively articulating said distal portion.

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**5,490,820**

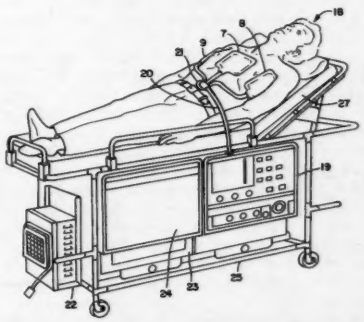
**ACTIVE COMPRESSION/DECOMPRESSION CARDIAC ASSIST/SUPPORT DEVICE AND METHOD**

**Robert B. Schock, Sparta, and Victoria Hunsicker-Sanko, Montclair, both of N.J., assignors to Datascope Investment Corp., Montvale, N.J.**

**Filed Mar. 12, 1993, Ser. No. 31,195**

**Int. Cl.[6] A61H** *31/00*

**U.S. Cl. 601—41** **45 Claims**



**18**. A device for compressing and decompressing a patient's thorax, the patient having a heart, comprising:

a first inflatable bladder and a first opposing surface, said first bladder and said first opposing surface being dimensioned and disposed so that when the patient is placed therebetween, said

first bladder and said first opposing surface are respectively positioned across an anterior part and a posterior part of the patient's thorax;

a second inflatable bladder which is substantially adjacent to and lateral of the patient's thorax, and a second opposing surface, said second bladder and said second surface being dimensioned and disposed so that when the patient is placed therebetween, said second bladder and said second opposing surface are positioned across at least a part of the lateral regions of the patient's thorax; and

an inflation controller for sequentially inflating and deflating said first and said second bladders, wherein said first bladder is inflated, the patient's thorax is compressed and pressure in the thorax increases, so that blood is driven away from the heart, and wherein when said second bladder is inflated, lateral force is applied to the patient's thorax and the patient's thorax is decompressed and pressure in the thorax decreases, so that blood is drawn toward the heart.

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**5,490,821**

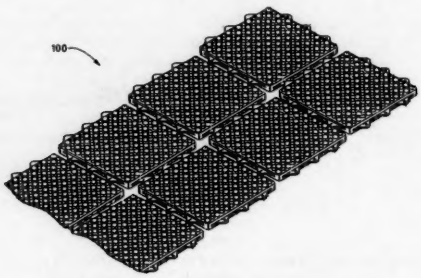
**MASSAGE DEVICE FOR THE SOLES OF THE FEET**

**Otto Wu, Room 918, 15 Fu Hsing N. Road, Taipei, Taiwan, Prov. of China**

**Filed Oct. 22, 1993, Ser. No. 140,324**

**Int. Cl.[6] A61H** *7/00*

**U.S. Cl. 601—134** **5 Claims**




1. A massage device for the soles of the feet comprising a plurality of massage units releasably coupled one to another to form a track upon which a user walks, each of said plurality of massage units including:

a hollow body formed of a resilient air impervious material and having an upper surface for supporting a user's feet, said hollow body having a single air filled enclosed interior cavity for establishing a predetermined rigidity of said upper surface;

a plurality of first projections formed in a uniform distribution on said upper surface of said hollow body, each of said plurality of first projections being formed of a solid material composition having a pebble-like contour, each of said plurality of first projections extending a first predetermined height from said upper surface;

a plurality of second projections formed in a uniform distribution on said upper surface of said hollow body in alternating relation with respect to said plurality of first projections, each of said plurality of second projections being formed of a solid material composition having a pebble-like contour, each of said plurality of second projections extending a second predetermined height from said upper surface, said second predetermined height being greater than said first predetermined height; and,

means for releasably coupling one of said plurality of massage units to another of said plurality of massage units; said releasable coupling means includes a plurality of first side flange members extending from at least one side of said hollow body and a plurality of second side flange members extending from an opposing side relative to said at least one side of said hollow body, each of said plurality of first side flange members having a boss extending from a lower surface thereof, each of said plurality of second side flange members having a through opening formed therein for receipt of a respective boss of a first side flange member of another of said plurality of message units.

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**5,490,822**

**ORTHESIS JOINT**

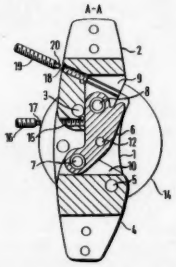
**Lutz Biedermann, Schwenningen, Germany, assignor to Biedermann Motech GmbH, Schwenningen, Germany**

**Continuation of Ser. No. 973,073, Nov. 6, 1992, abandoned. This application Aug. 19, 1994, Ser. No. 293,123**

**Claims priority, application Germany, Nov. 11, 1991, 41 37 056.2**

**Int. Cl.[6] A61F** *5/00*

**U.S. Cl. 602—16** **12 Claims**




1. An orthesis joint comprising a first plate, a second plate, a thigh attachment part and a leg attachment part, a first bushing coupling said thigh attachment part to said first and second plates, a second bushing coupling said leg attachment part to said first and second plates, said leg and thigh attachment parts having slotted recesses in which a connecting member is positioned, said connecting member coupled to said leg attachment part and said thigh attachment part, said second plate having a portion defining a hole, a bush coupled to said connecting member and which also extends through said hole, said attachment parts and connecting member coupled together for relative rotatable movement with respect to each other and said plates and a pressure cushion member coupled to said bush on the side of said hole opposite said hole side closest to the connecting member so that the pressure cushion will not interfere with the movement of the attachment parts and move with the connecting member as the thigh part and leg part are rotatably moved relative to one another.

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**5,490,823**

**WATER THERAPY AND FITNESS DEVICE**

**Brian J. Awbrey, and Kipp K. Dye, both of 151 Merrimac St., Boston, Mass. 02114**

**Filed Dec. 9, 1993, Ser. No. 165,092**

**Int. Cl.[6] A63B** *21/04;21/055*

**U.S. Cl. 482—55** **2 Claims**

1. A water fitness, exercise and therapy apparatus for a human user comprising in combination:

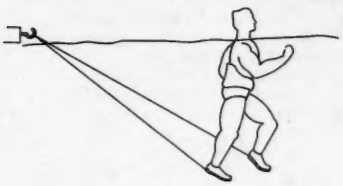
(a) a pool containing water,

(b) an elastic tether,

(c) a shoe worn on each foot of the user, said shoe being arranged, constructed and adapted for use in said water and to accommodate a running action of the foot and ankle,

a sole attached to the bottom of said shoe,

an inflatable bladder to provide flotation buoyant force adjustment, where the bladder to attached to, constructed within, the sole, and where the bladder does not extend laterally from the shoe so that the user experiences no impediment to performance running motions with the user's lower extremities,



(d) means to attach the tether to each shoe,

(e) a fixed station attached to the side of said pool,

(f) means for slidably retaining the tether to said fixed station, whereby the user trains by moving the user's legs and the shoes through said water and stretching the tether against the tether elastic force and where the tether slides at the fixed station to accommodate such training.

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**5,490,824**

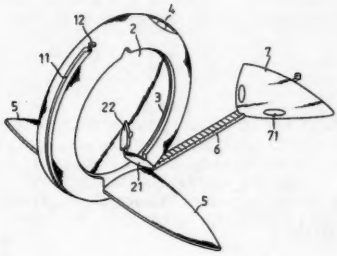
**LIMB EXERCISER**

**Chih C. Wang, 2F., No. 3, Lane 280, Chung-Chan Rd., Hsin Tien City, Taipei Hsien, Taiwan, Prov. of China**

**Filed Dec. 13, 1994, Ser. No. 357,611**

**Int. Cl.[6] A63B** *22/06*

**U.S. Cl. 482—60** **2 Claims**




**1**. A limb exerciser comprising a semi-rigid outer wheel housing and a resilient and flexible inner wheel, said inner wheel being tightly but rotatably set in a space defined by said outer wheel housing and being fixed in place by means of two circumferentially flanged wheel rims disposed at each side of said outer wheel housing, characterized in that two extension wings are pivotally connected to two sides of said outer wheel housing at a bottom central portion thereof such that said extension wings can be pivotally extended outward to a horizontal position relative to said outer wheel housing, that two openings are formed at two sides of said inner wheel at diametrically opposite positions so as to each pivotally connect and receive an actuating member therein, that two friction members are disposed between circumferential contact surfaces of said inner wheel and said outer wheel housing at diametrically opposite positions with one of said friction members being connected to a and an adjusting nut which, when being turned by rotating said adjusting nut provided at a top thereof, can change the frictional force produced when said inner wheel rotates in and relative to said outer wheel housing, that said outer wheel housing includes a track, a pad and a receiving groove of proper length and an ear slot extended from a first end of said receiving groove to receive a track pivotally connected to a second end of said receiving groove with a projected end of said track received and stopped in said ear slot, and that said pad which can be rolled up about said track is attached to a free end of said track.

**5,490,825**

**MULTI PURPOSE EXERCISE POLES WITH MANY OPTIONAL ATTACHMENTS**

**William T. Wilkinson, P.O. Box 572, Crownsville, Md. 21032-0572**

**Continuation-in-part of Ser. No. 846,053, Mar. 5, 1992, and Ser. No. 941,304, Sep. 4, 1992. This application Sep. 6, 1994, Ser. No. 301,069**

**Int. Cl.[6] A63B** *21/06*

**U.S. Cl. 482—74** **29 Claims**

**1**. A pole device for the aiding of forward movement comprising:

(a) at least one tubular shaft which forms a pole having a top and bottom end and having at least one bend or adjustable offset in said shaft,

(b) means for exercising a user's arms during the course of forward movement of the user's legs, during relative movement of the user's arms with respect to the user's body while the user grips the top end of the pole by the user's hand during the course of forward movement of the user's legs,

(c) the bottom end of said pole being of sufficient length for the user to grip said top end of said pole during the course of forward movement while said bottom end of said pole touches a ground surface, and

(d) wherein the touching of said bottom end with the ground surface comprises a push off means to assist the user in moving forward.

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**5,490,826**

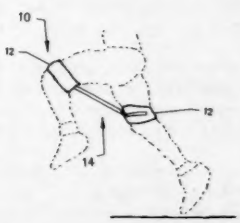
**LEGWORK STRENGTHENING AND TRAINING DEVICE**

**Leighton K. Rose, 3482 W. 82nd St., Inglewood, Calif. 90305**

**Filed Sep. 30, 1994, Ser. No. 315,944**

**Int. Cl.[6] A63B** *21/02*

**U.S. Cl. 482—74** **7 Claims**




**1**. A legwork strengthening and style training device comprising:

a pair of leg straps adapted for engagement around a wearer's thighs just above the wearer's knees, each leg strap having an elongate sliding strap means with two ends and an elongate intermediate region, each end being attached to the leg strap, with the intermediate region being unattached to and overlaying the leg strap;

a pair of sliding snap hooks, each having one end which is slidably retained on the intermediate region of the elongate sliding strap, and another end with a hook means; and

an elastic resistance member having an elongate elastic central body with attachment ends located at terminal ends of the elastic central body, wherein the leg straps are adapted for wrapping around the wearer's thighs just above the knees and the attachment ends of the elastic resistance member are hooked onto the hook means of the sliding snap hooks, and wherein the sliding snap hooks are slideable n said elongate sliding strap around a portion of the circumference of the leg straps so that during use of the legwork strengthening and style training device, the pair of leg straps do not spin and twist on the wearer's legs.

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**5,490,827**

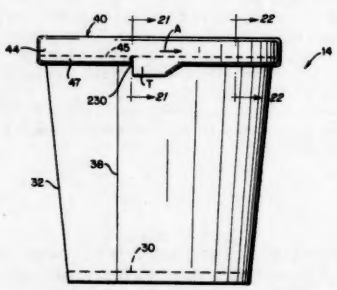
## TAMPER EVIDENT CONTAINER AND RELATED APPARATUS

**Peter T. Van de Geijn, Westminster, Md.; Kenneth H. Bealer, York, Pa.; Edward M. Earnest, Owings Mills, Md.; Kenneth H. Kuykendall, Sr., Westminster, Md., and Larry S. Maccherone, Severna Park, Md., assignors to Sweetheart Cup Company, Inc., Owings Mills, Md.**

**Continuation-in-part of Ser. No. 26,202, Feb. 26, 1993, Pat. No. 5,253,772, which is a continuation of Ser. No. 876,907, Apr. 30, 1992, abandoned, which is a continuation of Ser. No. 703,858, May 21, 1991, abandoned. This application Oct. 25, 1993, Ser. No. 140,830**

**Int. Cl.[6] B31B** *1/90*

**U.S. Cl. 493—109** **12 Claims**




1. Apparatus for securing a tamper evident lid to a container wherein the lid includes a depending skin portion and the container includes a rim at an upper open end thereof, the apparatus comprising:

a) first means for pressing a lower portion of the depending skin portion of the lid under and into engagement with the rim of the container to form a curl about a major peripheral portion of the lid while leaving a minor peripheral portion uncurled; and

b) second means cooperating with said first means for simultaneously forming a vertical slit in said lower portion of said depending skin portion at an interface between the curled and uncurled portions to thereby simultaneously form a grip tab therein.

**5,490,828**

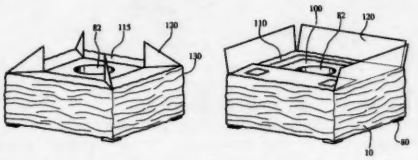
## BULK CONTAINER AND PROCESS FOR MANUFACTURE OF SAME

**Norwin C. Derby, Sherman, Tex., assignor to Super Sack Manufacturing Corp., Dallas, Tex.**

**Filed Dec. 2, 1993, Ser. No. 160,229**

**Int. Cl.[6] B31B** *47/00;1/62;49/04*

**U.S. Cl. 493—220** **6 Claims**




1. A method of manufacturing a flexible bulk container having a sidewall and bottom wall, said method comprising the steps of:

(a) supplying a sidewall blank having a substantially hollow tubular configuration, said sidewall blank having an upper portion and a lower portion and an inside and an outside;

(b) supplying a bottom wall of predetermined horizontal cross-sectional size and shape;

(c) placing the bottom wall on a raised work area;

(d) applying adhesive to the bottom wall;

(e) positioning the sidewall blank over the raised work area and lowering the sidewall blank such that the lower portion of the sidewall blank is located below the work area and the upper portion is located above the work area; and

(f) subsequent to steps (a) through (e), securing the sidewall blank to the bottom wall by folding the upper portion of the sidewall blank over the bottom wall, such that the inside of the blank contacts the adhesive located on the bottom wall.

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**5,490,829**

## DOCUMENT FOLDING MACHINE EMPLOYING A FLAP

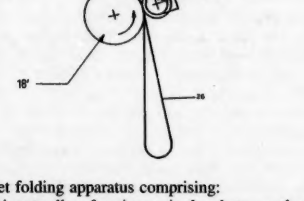
**Jacques Beord, Conches, and Herv´´ Baumann, Paris, both of, France, assignors to Secap, Boulogne Billancourt, France**

**Filed May 3, 1994, Ser. No. 237,345**

**Claims priority, application France, May 3, 1993, 93 05244**

**Int. Cl.[6] B65H** *45/18;37/06;45/16;* **B42C** *1/00*

**U.S. Cl. 493—419** **6 Claims**




1. A sheet folding apparatus comprising:

a pair of input rollers forming a nip therebetween through which a sheet of paper is fed;

a first control means operatively coupled to the input rollers for controlling the movement thereof;

a pair of output rollers forming a nip therebetween for discharging the sheet therethrough;

a second control means operatively coupled to the output rollers for controlling the movement thereof;

a paper guide pivotally mounted between the input rollers and output rollers, the paper guide including a press roller, the

paper guide being pivotable between a first position wherein the press roller is engaged with an output roller forming a nip therebetween and a second position wherein the press roller is pivotably disengaged from the output roller.

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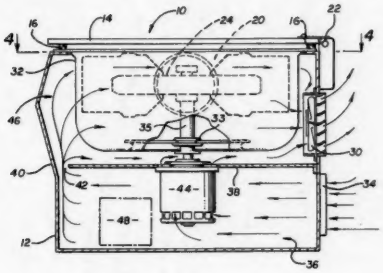
**5,490,830**

## AIR-COOLED BIOHAZARD CENTRIFUGE

**Charles Lovelady, Irving, and Bert R. Williams, III, DeSoto, both of Tex., assignors to Global Focus Marketing & Distribution, Irving, Tex.**

**Filed Apr. 12, 1994, Ser. No. 225,990**
**Int. Cl.[6] B04B** *5/02;7/02;15/02*
**U.S. Cl. 494—14** **19 Claims**




**1**. A centrifuge adapted for use with hazardous materials, comprising:

an outer centrifuge housing defining an exterior surface of the centrifuge and an interior space therein, further comprising openings in the outer centrifuge housing adapted for admitting air and exhausting air;

an inner rotor chamber housing defining a sealable rotor chamber supported by the outer centrifuge housing, the rotor chamber being sealed to prevent movement of air between the rotor chamber and the interior space within said outer centrifuge housing;

a baffle having first and second sides incorporated within said outer centrifuge housing and separating the interior space of the outer centrifuge housing into a first portion and a second portion, said first and second portions interconnected by at least one opening in said baffle at a location where air is to flow between said first portion and said second portion from a first side of said baffle to a second side of said baffle, said air flowing from said first side to said second side of said baffle being directed onto and around said inner rotor chamber housing;

a rotor assembly adapted to hold specimens for centrifugation disposed within said sealable rotor chamber and carried by a rotor drive shaft which is actuated by a drive motor assembly incorporated in said centrifuge adapted for use with hazardous materials, said rotor drive shaft rotatably sealingly extending into said sealable rotor chamber; and

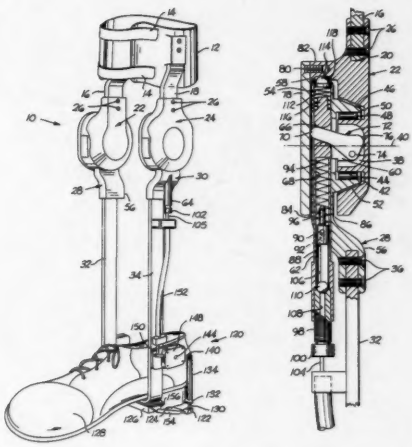
at least one fan, incorporated in said centrifuge adapted for use with hazardous materials which blows the air through at least one of said openings in the outer housing, wherein the at least one fan, outer centrifuge housing, baffle and inner rotor chamber housing cooperate to direct cooling air caused to move into and out of said outer centrifuge housing by said at least one fan onto and around the inner rotor chamber housing increasing contact of said air with said inner rotor chamber housing to remove heat therefrom, the inner rotor chamber housing providing a seal preventing the air directed through the outer centrifuge housing onto the inner rotor chamber housing from coming into contact with air from within the inner rotor chamber housing.

**5,490,831**

## SELECTIVELY LOCKABLE KNEE BRACE

**W. Neill Myers; Michael D. Shadoan; John C. Forbes, all of Huntsville; Kevin J. Baker, Cullman, and Darron C. Rice, Albertville, all of Ala., assignors to The United States of America as represented by the Administrator, National Aeronautics and Space Administration, Washington, D.C.**

**Filed May 25, 1994, Ser. No. 252,032**
**Int. Cl.[6] A61F** *5/00*
**U.S. Cl. 602—26** **26 Claims**




**1**. A knee brace for a patient rehabilitating from leg damage, said brace comprising harness means for attachment about the leg of the patient above the knee, articulating brace means positionable at each side of the knee, each articulating brace means having an upper housing and a lower housing, means for securing each upper housing at a respective side of the leg of the patient to said harness, an elongated stirrup secured to each lower housing and adapted to extend lengthwise along a respective side of the leg of the patient below the knee, means for securing each stirrup to the leg of the patient below the knee, journal means for pivotably mounting each lower housing relative to a respective upper housing for relative movement about a lateral axis positionable so as to be substantially aligned with the knee, each upper housing having first clutch surface means, each lower housing having second clutch surface means corresponding to and engageable selectively with the first clutch surface means of a corresponding upper housing for permitting movement of the lower housings relative to the respective upper housing when the first and second surface means are disengaged and for locking the lower housing to the respective upper housings when the first and second surface elements engage, an actuator carried by and movable relative to each lower housing, each actuator having an abutment means moveable in a first direction for forcing the respective upper housing laterally substantially along said axis in one direction for engaging said first and second clutch surface means and moveable in a second direction for forcing the respective upper housing laterally substantially along said axis in a direction opposite to said one direction for disengaging said first and second clutch surface means, and control means adapted to be operable by movement of the leg of the patient connected to each actuator for moving each respective abutment means in said first and second directions selectively to move said upper housings relative to said lower housings for engaging or disengaging said first and second surface means whereby said lower housings may be locked relative to said upper housings or may pivot relative thereto about said lateral axis.

**5,490,832**

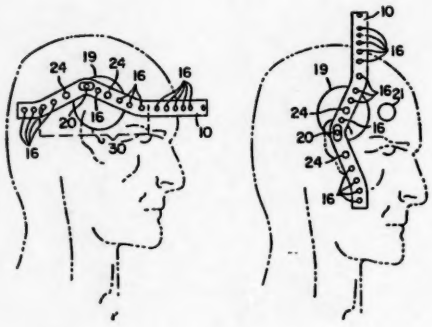
## CRANIAL TRACTION TONG CONVERTIBLE TO A HALO AND A METHOD OF APPLYING A HALO TO A PATIENT

Cameron C. Brown, 7 Downing Rd., Hanover, N.H. 03755

Division of Ser. No. 160,490, Dec. 1, 1993. This application May 19, 1995, Ser. No. 446,538

Int. Cl.[6] A61F 5/00

U.S. Cl. 602—37 9 Claims




1. A method of alternatively applying traction and immobilization to a patient with a single cranial device comprising:

affixing an open-ended cranial securing device to the head of the patient using tong pins;

applying traction to said patient;

removing traction from the patient;

rotating said device about said tong pins until said device is positioned horizontally when the head is in an upright position;

affixing said device to the head of the patient using skull pins; and

removing said tong pins.

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**5,490,833**

**Patent Not Issued For This Number**

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**5,490,834**

**Patent Not Issued For This Number**

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**5,490,835**

**Patent Not Issued For This Number**

**5,490,836**

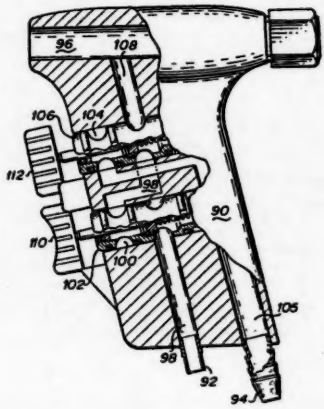
## ENDOSCOPIC SURGICAL INSTRUMENT

Ashvin H. Desai, 2338 Walsh Ave., Santa Clara, Calif. 95051

Continuation of Ser. No. 25,003, Mar. 2, 1993, abandoned, which is a continuation-in-part of Ser. No. 779,108, Oct. 18, 1991, Pat. No. 5,322,503. This application Oct. 26, 1994, Ser. No. 329,676

Int. Cl.[6] A61N 1/30; A61M 1/00

U.S. Cl. 604—21 2 Claims




1. An endoscopic surgical instrument comprising:

a) a single access conduit including

i) a first end having a probe connector for attaching a surgical probe thereto, and

ii) an opposite end having a port for insertion of surgical instrumentation;

b) a valve cartridge including

i) a body portion,

ii) an irrigation input connector for receiving fluid into said body portion,

iii) an evacuation output connector for expelling fluid and body tissue from said body portion,

iv) a male connector fitting for transmission of fluid from said body portion, and for receiving fluid and body tissue into said body portion,

v) a first valve providing fluid direction within said body portion for interconnecting said male connector fitting to said irrigation input connector, and having a manually operable push button activation means,

vi) a second valve providing fluid direction within said body portion for interconnecting said male connector fitting to said evacuation output connector, and having a manually operable push button activation means; and

c) a pistol grip extending from said single access conduit, said pistol grip including

i) a chamber formed within said pistol grip,

ii) a cartridge access opening formed through a wall of said pistol grip to said chamber for slideably receiving said valve cartridge therein,

iii) a central conduit connecting said chamber to said access conduit, and for making slidable connection with said male connector fitting, said central conduit for passage of fluids to said single access conduit from said body portion, and for passing fluids and body tissue from said single access conduit to said body portion, and

iv) activation means operable through a wall of said pistol grip for activating said push buttons.

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**5,490,837**

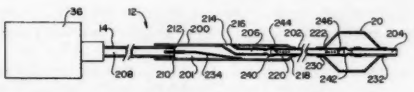
## SINGLE OPERATOR EXCHANGE CATHETER HAVING A DISTAL CATHETER SHAFT SECTION

**David J. Blaeser, Champlin, and Jon P. St. Germain, Maple Grove, both of Minn., assignors to SciMed Life Systems, Inc., Maple Grove, Minn.**

**Continuation-in-part of Ser. No. 55,695, Apr. 29, 1993, abandoned, which is a continuation-in-part of Ser. No. 725,064, Jul. 5, 1991, Pat. No. 5,281,203, and Ser. No. 843,647, Feb. 28, 1992, abandoned. This application Mar. 2, 1994, Ser. No. 204,988**

**Int. Cl.[6] A61M** *29/00*

**U.S. Cl. 604—96** **20 Claims**




1. An intravascular catheter assembly comprising:

(a) a main tubular member including at least one tubular section, said member having a lumen extending therethrough and a radial port intermediate the length thereof;

(b) a distal catheter shaft section having a proximal end connected to said radial port and a lumen therethrough, said distal catheter shaft section extending distally beyond the distal end of said proximal tubular member, wherein said distal end of said proximal tubular member is sealingly connected to said distal catheter shaft section, said distal catheter shaft section further having at least one first inflation hole through the wall thereof intermediate between said radial port and said distal end of said proximal tubular member; and,

(c) a balloon having a proximal end and a distal end sealingly connected to said distal catheter shaft section at a location spaced distally from the distal end of said proximal tubular member, said distal catheter shaft section having at least one second inflation hole through the wall thereof intermediate the ends of said balloon, such that said lumen of said proximal tubular member is in fluid communication with said balloon through said first inflation hole, said lumen of said distal catheter shaft section and said second inflation hole.

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**5,490,838**

## METHOD OF INSERTING A BALLOON CATHETER

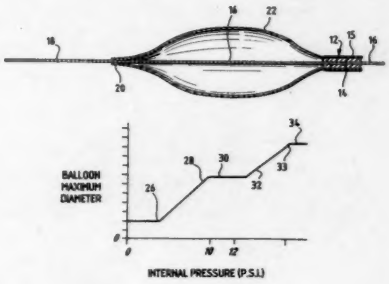
**Jay F. Miller, Miramar, Fla., assignor to Cordis Corporation, Miami Lakes, Fla.**

**Continuation of Ser. No. 78,511, Jun. 16, 1993, abandoned. This application Aug. 23, 1994, Ser. No. 294,659**

**Int. Cl.[6] A61M** *29/00*

**U.S. Cl. 604—96** **10 Claims**

1. The method of inserting a catheter into the arterial system of a patient which comprises the steps of inserting said catheter into the arterial system of a patient; increasingly pressurizing a lumen of said catheter through a first pressure, to cause a portion of said catheter having a work-hardening capability and having a diameter to elastically expand to such a degree that sufficient work-




hardening takes place under said pressure in the expanding catheter portion to cause the diameter of said catheter portion to substantially cease its expansion in response to a first pressure range increasing from said first pressure; and terminating the increase of said pressure in said first pressure range, whereby said catheter portion assumes a first, predetermined maximum diameter, said elastically expandable portion of said catheter being made of a plastic formulation selected from the group consisting of nylon and polyethylene materials having sufficient crystallinity to exhibit such work-hardening.

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**5,490,839**

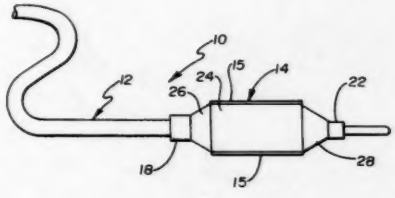
## CATHETER BALLOON WITH RETRACTION COATING

**Lixiao Wang, Minneapolis, and Linda J. Vickerman, Anoka, both of Minn., assignors to Scimed Life Systems, Inc., Maple Grove, Minn.**

**Continuation of Ser. No. 124,238, Sep. 20, 1993, abandoned. This application May 22, 1995, Ser. No. 445,581**

**Int. Cl.[6] A61M** *29/00*

**U.S. Cl. 604—96** **19 Claims**



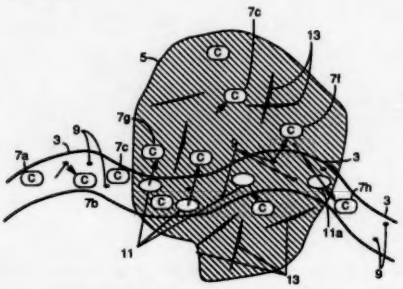

1. A balloon for a dilatation catheter comprising a balloon wall, the balloon having a central body portion, a substantially uniform exterior set coating of a polymer on said central body portion, the coating being set in a predetermined folded deflated configuration of the balloon.

5,490,840

## TARGETED THERMAL RELEASE OF DRUG-POLYMER CONJUGATES

Egidijus E. Uzgiris, Niskayuna; Lorinda R. Opsahl, Clifton Park; Kirby G. Vosburgh, Niskayuna; Thomas R. Anthony, Niskayuna, and Harvey E. Cline, Niskayuna, all of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Sep. 26, 1994, Ser. No. 312,362
Int. Cl.[6] A61B *17/20*
U.S. Cl. 604—22 5 Claims




1. A method of thermal drug treatment of tumor tissue of a subject comprising the steps of:

a) selecting drug molecules used in tumor tissue treatment of living subjects;

b) selecting a polypeptide carrier molecule of a size such that it will pass freely into tumor tissue but substantially none will pass into normal tissue;

c) binding drug molecules to carrier molecules to result in combined carrier/drug molecules;

d) introducing the carrier/drug molecules into a blood vessel of said subject having said tumor tissue desired to be destroyed causing the carrier/drug molecules to infuse into the tumor tissue; and

e) heating the tumor tissue employing focused ultrasound and the carrier/drug molecules within the tumor tissue to cause the carrier/drug molecules to produce a toxin having a relatively increased concentration in the tumor tissue as compared with the concentration in other tissues of said subject.

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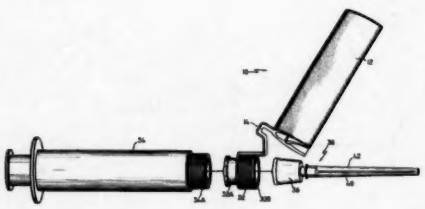
5,490,841

## SAFETY SHEATH DEVICE

Robert M. Landis, 1130 Puddingstone Rd., Mountainside, N.J. 07092

Filed Jul. 29, 1994, Ser. No. 282,608
Int. Cl.[6] A61M *5/00*
U.S. Cl. 604—110 30 Claims



1. In a needle protection device having an elongated housing pivotal to enclose a needle, the housing including a longitudinal slot for receiving a needle therethrough as the housing is pivoted to enclose the needle, the improvement comprising at least one elongated door member hingedly attached to the housing and extending across the longitudinal slot over substantially the entire length of the longitudinal slot, the door member being biased to close the longitudinal slot after a needle has entered the housing through the longitudinal slot.

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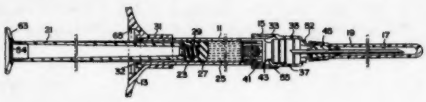
5,490,842

## SYRINGE PLUNGER ROD MOUNT

John F. Volk, Chester Springs, Pa., and Thomas Michaels, Upper Saddle River, N.J., assignors to Tri/West Systems, Inc., Upper Saddle River, N.J.

Continuation of Ser. No. 145,578, Nov. 4, 1993, abandoned, which is a continuation of Ser. No. 759,221, Sep. 26, 1991, abandoned, which is a continuation of Ser. No. 381,383, Jul. 18, 1989, Pat. No. 5,067,947. This application Feb. 16, 1995, Ser. No. 389,510
Int. Cl.[6] A61M *5/00*
U.S. Cl. 604—110 3 Claims



1. A syringe device, comprising:

a vial for medicaments having a first open end and a penetratable seal at its opposite second end, said first end having a plunger tip;

finger grip means mounted adjacent said first end; an elongated hollow plunger rod movable axially in the vial to a final discharge position when medicament is discharged, said hollow plunger rod having a first engagement means on one end for engagement with said plunger tip, said hollow plunger rod having first locking means located adjacent its open end for inserting a spent needle interiorly of the hollow plunger rod;

needle hub means for mounting a needle on said second end in axial alignment with said seal actuatable axially between an unarmed position spaced from said seal and an armed position penetrating said seal to access contents of said vial; and

means defining a cavity and an annular rib in said finger grip means and said hollow plunger rod having a radially outwardly directed disk portion which is sized to snap fit into said cavity behind said rib when said hollow plunger rod is actuated to said final discharge position such that the end of said hollow plunger rod is flush with said finger means grip.

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5,490,843

## FLEXIBLE ENDOSCOPIC SURGICAL PORT

Roger L. Hildwein; Robert C. Uschold, both of Cincinnati; J. D. Staley, Jr., Loveland; Paul Riestenberg, Cincinnati; Laura Gallagher, Maineville, and Rex Nagao, Cincinnati, all of Ohio, assignors to Ethicon, Inc., Somerville, N.J.

Division of Ser. No. 906,774, Jun. 30, 1992, abandoned. This application Jan. 6, 1994, Ser. No. 178,200
Int. Cl.[6] A61B *17/34*
U.S. Cl. 604—164 2 Claims

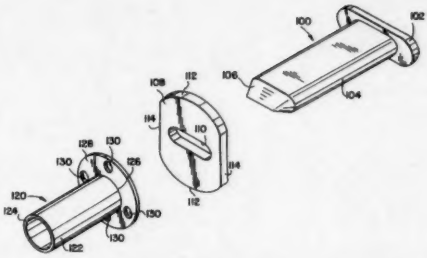
1. A trocar assembly for inserting a flexible trocar tube into an opening at an intercostal location in a body wall, comprising:

an elongated trocar obturator having a collar spaced proximally from the distal end of said obturator;

an elongated trocar tube of flexible material comprising a hollow tubular body having a substantially circular cross section with an annular flange projecting radially outward from one end of said tubular body; and

said trocar obturator being insertable into said hollow tubular body of said trocar tube with said collar engaging said flange and said distal end extending from said hollow tubular body for inserting said trocar tube into the opening at the intercostal location in the body wall; and

wherein said obturator has an oval-shaped cross section adapted to stretch the flexible trocar tube into an ovoid shape suffi-




ciently narrow in width to fit between the ribs at the intercostal location in the body wall.

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**5,490,844**

**Patent Not Issued For This Number**

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**5,490,845**

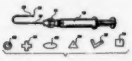
**R-X SAFETY CATHETER**

**Gabor J. Racz, 4412 17th St., Lubbock, Tex. 79416**

**Filed Sep. 20, 1994, Ser. No. 309,244**

**Int. Cl.[6] A61M** *5/32*

**U.S. Cl. 604—266** **6 Claims**



1. A safety catheter facilitating the flow of fluids to and from a body and the safe removal of said catheter from said body, said safety catheter comprising:

an elongated cylindrical member having a bore therethrough; and

at least one retrieval member extending throughout said bore and extending from each end of said cylindrical member, a first portion of said retrieval member extending beyond an end of said cylindrical member terminating in an end having a greater diameter than said bore of said cylindrical member to prevent said end from entering said bore of said cylindrical member wherein said retrieval member maintains said bore of said cylindrical member open to allow said flow of said fluids to and from said body and the safe retrieval of said cylindrical member from said body and wherein said retrieval member comprises a loop formed on said first portion of said retrieval member extending beyond an end of said cylindrical member to prevent passage of said first portion through said cylindrical member.

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**5,490,846**

**SURGE MANAGEMENT FIBROUS NONWOVEN WEB FOR PERSONAL CARE ABSORBENT ARTICLES AND THE LIKE**

**Clifford J. Ellis, Woodstock, Ga., and Rob D. Everett, Menasha, Wis., assignors to Kimberly-Clark Corporation, Neenah, Wis.**

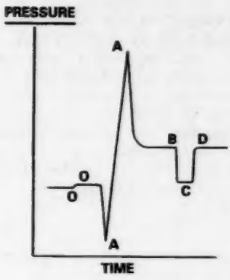
**Continuation of Ser. No. 206,069, Mar. 4, 1994, abandoned. This application Feb. 9, 1995, Ser. No. 386,245**

**Int. Cl.[6] A61F** *13/15;13/20*

**U.S. Cl. 604—366** **16 Claims**

1. A fibrous nonwoven web comprising:

a plurality of thermoplastic fibers heat bonded to one another to form a uniformly mixed, single layer nonwoven web having a basis weight of at least 20 grams per square meter, a void volume of between about 40 and 60 cubic centimeters per gram of web at 689 dynes per square centimeter pressure, a permeability of about 5,000 to about 8,000 darcy a porosity of about 97.2% to about 98.8% and a surface area per void volume of about 24 to about 49 square centimeters per cubic centimeter.

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**5,490,847**

**DISPOSABLE SANITARY NAPKIN**

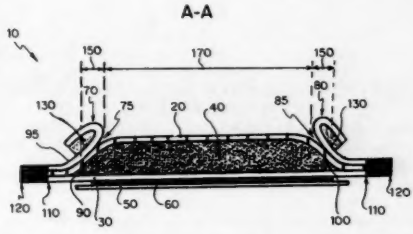
**Mauro F. C. Correa, Av. Higienópolis, no. 101, 140 andar, Sao Paulo, SP; Telma Sinicio, Rua Jornalista Napoleao, Monteiro, no. 691, and Fernanda S. Achcar, Av. Tivoli, no. 423, apto. 203, Sao José dos Campos, SP, all of, Brazil**

**Filed Nov. 22, 1993, Ser. No. 156,191**

**Claims priority, application Brazil, Nov. 25, 1992, 9204863**

**Int. Cl.[6] A61F** *13/15*

**U.S. Cl. 604—387** **20 Claims**




1. Disposable intimate feminine absorbent comprising:

an upper liquid permeable sheet;

a lower liquid impermeable lining sheet;

a liquid absorbent core between said sheets;

at least one absorbent cuff comprised of a layer of hydrophilic material disposed on top of the upper liquid permeable sheet and affixed along at least one edge of said absorbent; and

at least one lateral wing comprised of continuous extension of said upper liquid permeable sheet, said lower liquid impermeable sheet, and said layer of hydrophilic material;

said cuff when flexed moving away from said upper sheet to provide a region for containing liquid.

**5,490,848**

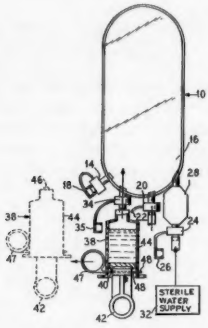
## SYSTEM FOR CREATING ON SITE, REMOTE FROM A STERILE ENVIRONMENT, PARENTERAL SOLUTIONS

**Mike Finley, Park City; Mike Scharf, McHenry; Jeff Packard, Grayslake; Jim Kipp; Tom Dudar, both of Palatine; Jim Owens, McHenry, and Al Bindokas, Clarendon Hills, all of Ill., assignors to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.**

**Filed Jan. 29, 1991, Ser. No. 647,113**

**Int. Cl.[6] A61M** *5/00*

**U.S. Cl. 604—403** **47 Claims**




**1**. A system for creating on site, remote from a sterile environment, parenteral solutions in a large volume parenteral container for intravenous administration to a patient comprising:

an empty large volume containers including at least one port for accessing an interior of the container and having a sterilizing filter for sterilizing a fluid fed through the port into the container;

a second container including a solute and having means for coupling the second container to the large volume container and providing fluid communication therebetween allowing the solute to be received within the interior of the container; and

a sterile water source including means for placing the sterile water source in fluid communication with the port and allowing sterile water to flow from the sterile water source into the interior of the container.

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**5,490,849**

## UNIFORM-RADIATION CAUSTIC SURFACE FOR PHOTOABLATION

**Robert F. Smith, 3714 Henley Dr., Pittsburgh, Pa. 15235**

**Continuation-in-part of Ser. No. 552,298, Jul. 13, 1990, abandoned. This application Jan. 23, 1992, Ser. No. 824,775**

**Int. Cl.[6] A61M** *5/06*

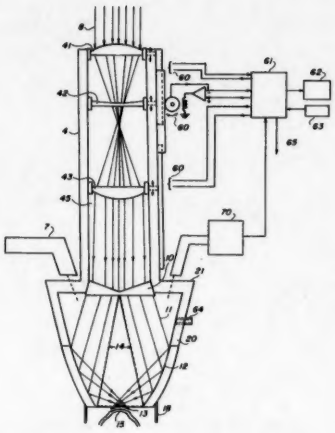
**U.S. Cl. 606—5** **24 Claims**

**1**. A method having a surface area, a desired curvature, and of substantially creating a caustic surface of uniform intensity radiation using a catadioptric device comprising at least one axicon lens, each having a surface and a surface area, and a mirror, said method comprising the steps of:

selecting: (1) a starting coordinate point corresponding to a minimum radial distance from a optical axis for the mirror of said catadioptric system; (2) a ratio of the surface area of the axicon lens, of said catadioptric system, to the surface area of said caustic; (3) the desired curvature of said caustic;

calculating positions of rays through said axicon corresponding to tangential rays which form said caustic that maintain said ratio of areas constant;

varying slopes of said axicon rays so that intersection with said corresponding caustic tangential rays produces the locus of coordinate points of a meridional cross section of said mirror subject to a law of reflection;



calculating said coordinate points for at least one surface of at lease one of said axicon lens to produce a desired set of axicon rays subject to the law of refraction.

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**5,490,850**

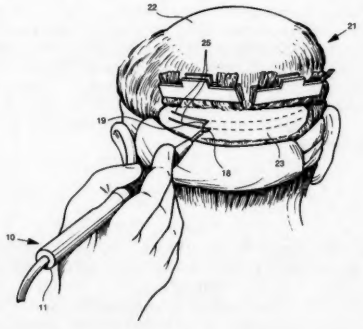
## GRAFT HARVESTING HAIR TRANSPLANTS WITH ELECTROSURGERY

**Alan G. Ellman, and Jon C. Garito, both of 1135 Railroad Ave., Hewlett, N.Y. 11557**

**Division of Ser. No. 63,727, May 20, 1993, Pat. No. 5,395,368. This application Nov. 21, 1994, Ser. No. 342,618**

**Int. Cl.[6] A61B** *17/39*

**U.S. Cl. 606—45** **5 Claims**



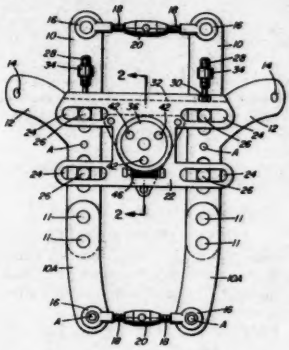
**1**. In a method for harvesting hair grafts from strips of scalp wherein parallel incisions are made in the scalp, the improvement comprising making the incisions with an electrosurgical instrument comprising an electrode with spaced thin active wire ends by drawing the electrode wire ends across the scalp while energizing the electrosurgical instrument.

5,490,851

## METHOD AND APPARATUS FOR TREATMENT OF IDIOPATHIC SCOLIOSIS

Nikolay N. Nenov, 6404 St George Street, Vancouver, B.C., Canada, and Orlin Nedelchev, 602 - 1040 Pacific Street, Vancouver, B.C., Canada

Filed Aug. 2, 1994, Ser. No. 284,944
Int. Cl.[6] A61B *17/70;17/60;17/56*
U.S. Cl. 606—61 7 Claims



1. Apparatus to treat scoliosis comprising:
a pair of longitudinal struts each strut having opposed ends;
means to adjust the separation of said struts;
a cross member extending between said struts and pivotally mount to each strut, the cross member having opposed ends;
a sub-frame, pivotally attached to the cross member;
means adapted to be received in the pelvic girdle to secure said apparatus to a patient's pelvic girdle, said means being mounted on said sub-frame:
means to pivot said cross member relative to said longitudinal struts to move said struts and thus move the patient's sacrum towards the innominate bones.

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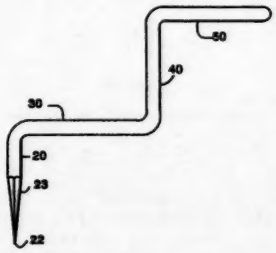
5,490,852

## ORTHOPEDIC AWL

Samir N. Azer, 9335 Mt. Vernon Cir., Alexandria, Va. 22309, and William R. Krause, 820 Gilliams Mountain Rd., Charlottesville, Va. 22903

Filed Feb. 16, 1994, Ser. No. 197,078
Int. Cl.[6] A61B *17/16*
U.S. Cl. 606—79 2 Claims




1. An awl for providing an entry hole into a bone and subsequent penetration of the awl into said bone, said awl being a unitary structure comprising:
a first section, said first section being substantially an elongated member having a longitudinal axis, and having
a first end and
an exterior end, said exterior end having a cutting tip,
a second section, said second section being an elongated member having a first end and
a second end, said second end being integral with said first end of said first section, said first end of said second section and extending approximately normal from said first section,
a third section, said third section being an elongated member having a longitudinal axis, said first section, said second section and said third section lying in a first plane, said third section having
a first end, integral with said first end of said second section, and
a second end, said longitudinal axis of said third section being parallel to said longitudinal axis of said first section, said third section providing an external reference for the orientation of said cutting tip,
a fourth section, said fourth section lying in said first plane and having
a first end, integral with said third section second end, and
a second end, directed away from said longitudinal axis of said first section, said fourth section forming an angle of approximately 90 degrees with said third section,
whereby the orientation of said third section represents the orientation of said first section and said fourth section is a hand hold section.

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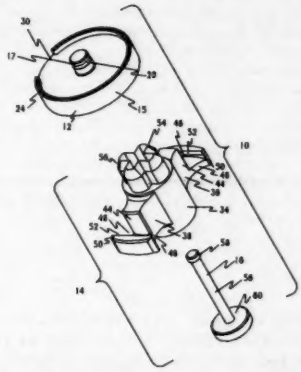
5,490,853

## ORTHOPEDIC BONE PLUG CUTTER

Brian D. Burkinshaw, Pflugerville, and John L. Wheeler, Victoria, both of Tex., assignors to Intermedics Orthopedics, Inc., Angleton, Tex.

Filed Jun. 8, 1994, Ser. No. 255,382
Int. Cl.[6] A61B *17/16*
U.S. Cl. 606—79 9 Claims



1. An orthopedic bone plug cutter for cutting a customized scavenged bone plug for insertion in the medullar canal of a patient to retain bone cement in an area surrounding a prosthesis, said prosthesis having an articulating surface and a shaft adapted to be implanted in the medullar canal, said shaft having a proximal end adapted to be connected to said articulating surface and a distal end spaced away from said articulating surface, said distal end having a perimeter, said bone plug cutter comprising:
means for shaping an intact plug from a segment of bone, said shaping means having a cutting head having a blade on one end thereof, said blade circumscribing a customized perimeter, said customized perimeter being congruent with said perimeter of said distal end of said prosthesis, said blade having an inside wall and an outside wall and a bevel along the perimeter of said outside wall, said bevel extending in an inward and distal direction from said outside wall toward said inside wall;
an anvil confronting said blade; and

a clamp means connecting said shaping means and said anvil for forcing said blade of said cutting head against said anvil.

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**5,490,854**

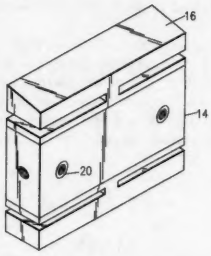
**SURGICAL CUTTING BLOCK AND METHOD OF USE**

**Michael G. Fisher, Eldorado Hills, Calif., and Joe Nemeth, Saint Albans, Vt., assignors to Synvasive Technology, Inc., Rancho Cordova, Calif.**

**Continuation-in-part of Ser. No. 838,486, Feb. 20, 1992, abandoned. This application Aug. 17, 1993, Ser. No. 107,468**

**Int. Cl.[6] A61B** *17/15;17/56*

**U.S. Cl. 606—88** **12 Claims**




**4**. A surgical cutting block for use in guiding bone saws and similar blades in orthopaedic surgery, said cutting block comprising:

a) a core unit having a first end and a second end;

b) a first cutting guide unit coupled to the first end of said core unit and provided with a through channel having at least one cutting guide surface; and

c) a second cutting guide unit coupled to the second end of said core unit and provided with a through channel having at least one cutting guide surface,

wherein each of said cutting guide units is provided with a cutting guide surface formed of a material having a Knoop hardness of 466 or greater (under a 500 gm load), a nickel content of 0% to less than 4% and a chrome content of 0% to less than 10%, said material selected from the group consisting of substantially homogenous ceramic oxides, substantially homogenous ceramic carbides, substantially homogenous ceramic borides, substantially homogenous ceramic nitrides, nitrogen-hardened titanium, and nitrided cobalt chrome.

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**5,490,855**

**DEVICE TO STABILZE A CUTTING MEANS FOR THE FITTING OF A PROSTHESIS IN BONE SURGERY**

**Jean-Pierre Bouraly, Montbeliard; Jurg Aebi, Rodez; Philippe Beaufils, Magny les Hameaux; Michel de Lestang, Amiens; Jean-Gilles Gaffuri, Rumilly En Cambresis; Hervé Hourlier, Wignehies; Jean-Jacques Lallement, St. Andre Les Vergers; Philippe Legroux, Le Bouscat; Jean-Paul Levai, Clermond-Ferrand; Gérald Pondaven, Quimper; Pierre Schuster, Saint Avold, and Christian Vergnat, Metz, all of, France, assignors to Developpement D'Implants Orthopediques et Medicaux, and Protek Synthes, both of Etupes Cedex, France**

**Filed Jan. 27, 1994, Ser. No. 187,260**

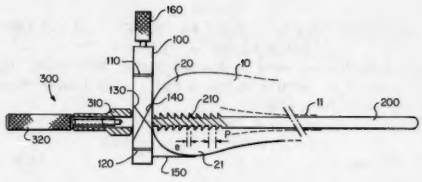
**Int. Cl.[6] A61B** *17/56*

**U.S. Cl. 606—88** **3 Claims**

**3**. An axially stabilized apparatus used for cutting the end of a bone in preparation of fitting a prosthesis during bone surgery, comprising:

a centering rod for partial insertion into an intramedullar canal of the bone;

a threaded portion formed on an intermediate section of the rod for threaded anchoring engagement with a proximal end of the bone canal, that axially stabilizes the rod;




a cutting block slidably mounted to the centering rod, at a point outwardly adjacent a proximal end of the bone; and

means mounted on an outward end portion of the centering rod for axially clamping the block against the bone;

wherein the threaded rod portion has a length less than 50% of the overall rod length, and sufficient diameter to secure the centering rod axially immobilized in the bone.

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**5,490,856**

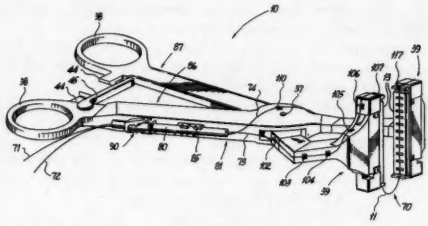
**PURSE STRING STAPLER**

**Wayne C. Person, Newtown, Conn.; Marc J. Theroux, Slatersville, R.I.; Kurt Azarbarzin, Brewster, N.Y., and Richard N. Granger, Huntington, Conn., assignors to Untied States Surgical Corporation, Norwalk, Conn.**

**Filed Dec. 14, 1993, Ser. No. 167,272**

**Int. Cl.[6] A61B** *17/00*

**U.S. Cl. 606—139** **22 Claims**




**4**. A suture retaining member for mounting a suture on an outer surface of a surgical instrument comprising:

a tubular member having a longitudinal bore extending therethrough;

a resiliently hinged clamp member cooperating with said tubular member for securing a suture at least partially disposed within the tubular member, the clamp member having a resiliently hinged portion for pivoting a first portion of the clamp member to compress the tubular member against a second portion of the clamp member and at least one opening formed within the resiliently hinged portion for passing the tubular member therethrough.

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**5,490,857**

**Patent Not Issued For This Number**

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**5,490,858**

**METHOD AND APPARATUS FOR HANDLING SUTURING NEEDLES**

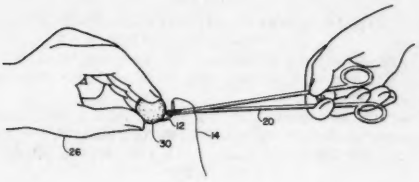
**David Shuter, 8642 Marlamoor La., Palm Beach Gardens, Fla. 33412**

**Continuation of Ser. No. 62,965, May 14, 1993, abandoned. This application Jul. 15, 1994, Ser. No. 275,827**

**Int. Cl.[6] A61B** *17/00*

**U.S. Cl. 606—148** **3 Claims**

**1**. A method for suturing the body with a suture needle, comprising the steps of:




grasping in one hand a device made entirely of a sterile, needle pervious material capable of retaining said needle when the point of the needle is thrust into the material and sized to completely fit within an enclosed hand;

placing a suture with the suture needle into the body;

thrusting the tip of the suture needle contaminated with biological material into the needle retaining material;

supporting the needle retaining material with the hand and substantially above the wound;

tying a suture knot; and

removing the needle from the needle retaining material, and repeating the above until the suturing process is completed.

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**5,490,859**

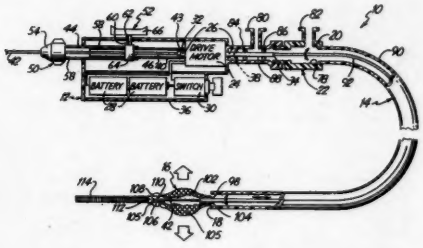
## EXPANDABLE INTRAVASCULAR OCCLUSION MATERIAL REMOVAL DEVICES AND METHODS OF USE

**Hans A. Mische; Thomas V. Ressemann, both of St. Cloud; Anthony C. Vrba, and Steven S. Hackett, both of Maple Grove, all of Minn., assignors to SciMed Life Systems, Inc., Maple Grove, Minn.**

**Continuation-in-part of Ser. No. 976,199, Nov. 13, 1992. This application Apr. 29, 1993, Ser. No. 55,995**

**Int. Cl.[6] A61B** *17/22*

**U.S. Cl. 606—159** **63 Claims**




**1**. An intravascular device for removing vascular occlusion material within a vascular lumen in a patient, wherein the occlusion material defines a configuration, the intravascular device comprising:

an expandable material removal element having first and second ends and including a plurality of wires disposed between the first and second ends;

a catheter shaft extending to the first end of the expandable material removal element;

a drive shaft for energizing the material removal element intravascularly; the drive shaft having a proximal end and a distal end, the drive shaft being connected to the second end of the material removal element proximate the distal end of the drive shaft extending through the material removal element and being shiftable with respect to the material removal element and the catheter shaft; the drive shaft being disposed within the catheter shaft; the material removal element being expandable responsive to shifting of the drive shaft; and the expandable removal element being sufficiently deformable so that the element assumes a configuration corresponding to the configuration defined by the non-occluded diameter upon expansion of the element; and

a collection portion disposed on the material removal element for collecting removed occlusion material, the collection portion including a retention member disposed on the wires of the removal element.

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**5,490,860**

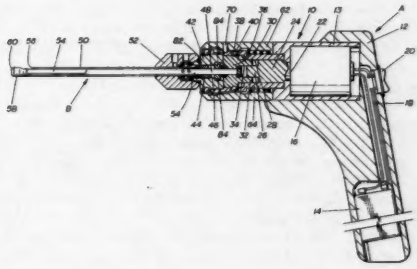
## PORTABLE POWER CUTTING TOOL

**George H. Middle, Reno; Edward A. Evans, and Craig Purdy, both of Sparks, all of Nev., assignors to Sofamor Danek Properties, Inc., Memphis, Tenn.**

**Filed Dec. 8, 1993, Ser. No. 163,999**

**Int. Cl.[6] A61B** *17/32*

**U.S. Cl. 606—171** **5 Claims**



**1**. A system for performing cutting operations during surgery, comprising:

a housing;

a motor mounted within said housing, said motor having a rotating output shaft; and

a plurality of surgical implement assemblies, each of which includes a different surgical implement and a transmission mechanism designed to impart a characteristic mode of motion to said surgical implement, a first said assembly producing rotary motion, a second said assembly producing reciprocating motion, and a third said assembly producing a combination of rotary and reciprocating motion;

wherein each of said surgical implement assemblies is selectively attachable one-at-a-time by a user to said motor output shaft to perform a different desired cutting operation using said different surgical implement and said mode of motion which is characteristic to said selected assembly.

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**5,490,861**

## TRACK GUIDED END EFFECTOR ASSEMBLY FOR USE WITH ENDOSCOPIC INSTRUMENTS

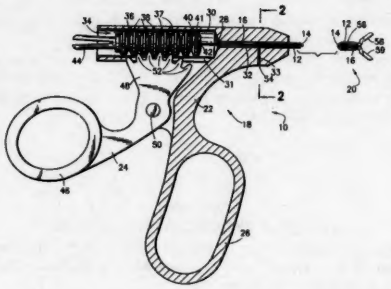
**Peter K. Kratsch, Sunrise, and Kevin F. Hahnen, Ft. Lauderdale, both of Fla., assignors to Symbiosis Corporation, Miami, Fla.**

**Filed Jul. 14, 1994, Ser. No. 275,290**

**Int. Cl.[6] A61B** *17/00*

**U.S. Cl. 606—205** **24 Claims**

**1**. An end effector assembly for use with an endoscopic instrument having a tube member, a control member extending through the tube member, and an actuator mechanism coupled to the proximal ends of the tube member and the control member whereby reciprocal movement of the control member through the tube member is effected by the actuator mechanism, said end effector assembly comprising:



a) a clevis means having a proximal portion for coupling with a distal end of the tube member, and having first and second inner curved walls defining a first curved channel extending from a distal portion of said clevis means towards said proximal portion of said clevis means, and having a throughbore extending from a proximal end of said clevis means to said first curved channel, said throughbore for receiving the control member;

b) first and second end effectors, said first end effector having a first proximally extending tang with first and second curved surfaces, said tang having a first proximal coupling means for coupling to the control member, said tang being disposed in said first curved channel such that said tang is guided by said first curved channel and when it is moved forward by the control member, a first curved surface of said tang engages said first inner curved wall and causes said first end effector to open relative to said second end effector, and when it is moved backward by the control member, said second curved surface of said tang engages said second inner curved wall and causes said first end effector to close relative to said second end effector.

**5,490,862**

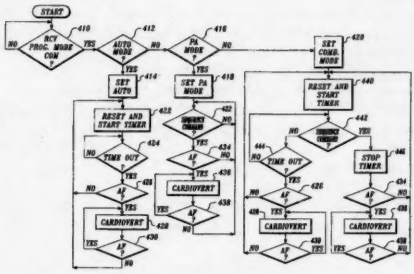
## ATRIAL DEFIBRILLATOR HAVING PATIENT ACTIVATED MODALITY

**John M. Adams, 4704-194th Ave. SE., Issaquah, Wash. 98027, and Clifton A. Alferness, 2202-235th Ave. NE., Redmond, Wash. 98053**

**Continuation-in-part of Ser. No. 96,029, Jul. 22, 1993, which is a continuation of Ser. No. 685,130, Apr. 12, 1991, Pat. No. 5,282,837. This application Sep. 15, 1994, Ser. No. 306,665**

**Int. Cl.[6] A61N *1/39***

**U.S. Cl. 607—6** **6 Claims**



1. An atrial defibrillator implantable beneath the skin of a patient comprising:

intervention sequence means for performing an intervention sequence, said intervention sequence means including an atrial fibrillation detector for determining if atrial fibrillation is present in a patient's heart and cardioverting means for applying cardioverting electrical energy to the atria of the patient's heart; and

sequence initiating means including receiving means for receiving a sequence command generated from external to the patient for causing the intervention sequence means to perform the intervention sequence.

5,490,863

## MULTIFUNCTIONAL ADDITIVES TO IMPROVE THE LOW-TEMPERATURE PROPERTIES OF DISTILLATE FUELS AND COMPOSITIONS THEREOF

David J. Baillargeon, West Windsor Township; Angeline B. Cardis, Florence, and Dale B. Heck, West Deptford, all of N.J., assignors to Mobil Oil Corporation, Fairfax, Va.

Continuation of Ser. No. 121,088, Sep. 14, 1993, abandoned, which is a continuation of Ser. No. 744,128, Aug. 13, 1991, abandoned, which is a division of Ser. No. 449,183, Dec. 13, 1989, Pat. No. 5,039,306. This application Aug. 15, 1994, Ser. No. 298,491

The portion of the term of this patent subsequent to Aug. 13, 2008, has been disclaimed.

Int. Cl.[6] C10L *1/22*

U.S. Cl. 44—331 24 Claims

9. A fuel composition comprising a major amount of a liquid hydrocathybyl fuel and a minor amount of from about 0.001 to about 10 wt. % based on the total weight of the composition of an oligomer/polymer additive product of reaction obtained by reacting in differing ratios (1) a secondary amine and a mixture of at least two different epoxides wherein one is selected from saturated or unsaturated $C_8$ to $C_{30}$ epoxides and the other is selected from $C_2$ to $C_{100}$ epoxides and thereafter (2) reacting the product of (1) with pyromellitic dianhydride or its acid equivalent and (3) reacting in situ the resultant reactive acid/anhydride with a hydrocarbyl diol or a polyhydrocarbyl diol under conditions sufficient to obtain esterification wherein said differing ratios are less than molar ratios, molar ratios and more than molar ratios and where the temperature of reaction varies from about 150° C. to 200° C., at pressures of from about 0.001 arm to about 1 arm with reaction times varying from about one to about 48 hours.

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5,490,864

## ANTI-WEAR LUBRICITY ADDITIVE FOR LOW-SULFUR CONTENT DIESEL FUELS

Sheldon Herbstman, New City; Doris Love, Fishkill; Michael P. Petrus, Wappingers Falls, and Cyril A. Migdal, Croton-On-Hudson, all of N.Y., assignors to Texaco Inc., White Plains, N.Y.

Continuation of Ser. No. 739,548, Aug. 2, 1991, abandoned. This application Jun. 22, 1994, Ser. No. 265,670

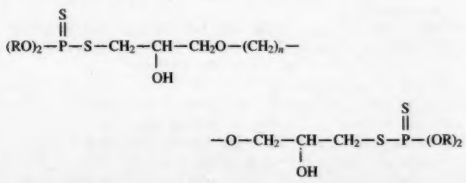
Int. Cl.[6] C10L *1/26*

U.S. Cl. 44—379 3 Claims

1. A diesel fuel composition comprising:

(a) a low-sulfur content diesel fuel having a sulfur content from about 0.01 to about 1.0%; and

(b) from about 5 PTB to about 100 PTB, as an anti-wear lubricity additive, of a dithiophosphoric diesterdialcohol represented by the formula:



where R is a ($C_4$–$C_{18}$) alkyl normal or iso-radical, and n=1–5.

5,490,865

## METHOD OF TREATING AND DYEING ANIMAL FIBERS

Jurg P. Schelwiller, Audresser, SA rue du Port, BP 119 27401 Louviers Cedex, France

Filed Jul. 25, 1994, Ser. No. 279,529

Int. Cl.[6] D06P *3/00;5/00*

U.S. Cl. 8—404 15 Claims

1. A process for producing multi-color effects on animal fiber comprising

a pretreatment step comprising exposing animal fiber to an aqueous ethanolamine solution to form pretreated fiber;

a treatment step comprising exposing the pretreated fiber to a treatment solution comprising lactic acid and a mordant having affinity for the pretreated fiber to form treated fiber;

a combining step comprising combining the treated fiber with fiber that has not been treated to form combined fiber; and

dyeing step comprising exposing the combined fiber to a dye bath comprising urea and EDTA and a dyestuff having affinity for the treated fiber.

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5,490,866

## PROCESS FOR WASHING OFF PRINTS OR DYEINGS ON CELLULOSIC TEXTILE MATERIALS

Christian Guth, Birsfelden, Switzerland, assignor to Ciba-Geigy Corporation, Tarrytown, N.Y.

Filed May 18, 1994, Ser. No. 245,389

Claims priority, application Switzerland, May 24, 1993, 1554/93

Int. Cl.[6] C09B *62/04;* C11D *7/60*

U.S. Cl. 8—549 12 Claims

1. A process for washing a print or dyeing produced with a dye on a cellulosic textile material, which comprises treating the printed or dyed material in an aqueous wash liquor with 0.25 to 5 grams per liter of a washing-off formulation consisting essentially of

(a) 50–50% polyvinyl pyrrolidone homopolymer or copolymer, and

(b) 95–50% of an alkali silicate.

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5,490,867

## METHOD OF MAKING A RECTANGULAR NICKEL-METAL HYDRIDE SECONDARY CELL

Hideaki Kozawa; Kazuo Kojima; Tomoyuki Ono, all of Yokohama; Hirofumi Yanagawa, Kawasaki; Hideaki Kitazume, and Kouji Taguchi, both of Yokohama, all of, Japan, assignors to Toshiba Battery Co., Ltd., Tokyo, Japan

Division of Ser. No. 95,429, Jul. 23, 1993, Pat. No. 5,372,897. This application Aug. 31, 1994, Ser. No. 298,662

Claims priority, application Japan, Jul. 24, 1992, 4-198613; Feb. 5, 1993, 5-18721; Mar. 1, 1993, 5-39896; Mar. 10, 1993, 5-48975

Int. Cl.[6] H01M *2/04*

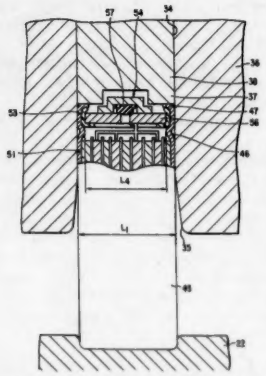
U.S. Cl. 29—623.2 7 Claims

1. A method of manufacturing a rectangular nickel-metal hydride secondary cell, comprising the steps of:

housing an electrode group and an alkali electrolyte in a rectangular cylindrical metal case having a bottom and a stepped portion formed along the inner surface of said metal case by enlarging the open end portion of said metal case, said electrode group being constructed such that a nickel positive electrode and a hydrogen absorption alloy negative electrode are superposed one upon the other with a separator interposed between the adjacent positive and negative electrodes;

mounting a rectangular cylindrical insulating gasket having a bottom and a rectangular sealing plate housed therein in advance on the stepped portion of said metal case, a rectangular hole being formed in the bottom of said insulating gasket;

reducing the diameter of the open end portion of said metal case to a value substantially equal to that of the main body portion




of said metal case by inserting the open end portion of said metal case to a drawing mold so as to press inward the rising wall of the insulating gasket, the mold having a rectangular hollow in the central portion and a tapered portion formed by outwardly enlarging the inner surface of the hollow in the lower portion of said mold and

abutting a curling mold against the open end portion of said metal case by dropping said curling mold to said metal case, so as to inwardly fold the open end portion of said metal case and, thus, to permit said sealing plate to be fixed under pressure to said metal case with said insulating gasket interposed therebetween, said curling mold having a rectangular hollow in the central portion, a rectangular recess formed in the bottom portion to communicate with the hollow and sized larger than the hollow, and a tapered portion formed in the inner surface in the lower end portion of the recess, the tapered portion having an angle of 0.5° to 10°,

rising said curling mold while holding downward said sealing plate with knock-out vertically movable within the hollow of said curling mold so as to detach said curling mold from said metal case.

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**5,490,868**

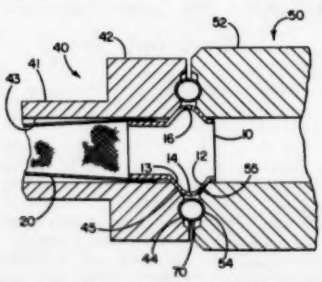
**IN-LINE FILTER FOR TUBING**

**Michael B. Whitlock; James A. Bair, both of Cortland, N.Y., and Hidenori Nakayama, Tsutiura, Japan, assignors to Pall Corporation, East Hills, N.Y.**

**Continuation of Ser. No. 16,294, Feb. 11, 1993, abandoned. This application Jul. 29, 1994, Ser. No. 282,769**

**Int. Cl.[6] B01D** *46/02;29/13*

**U.S. Cl. 55—503** **69 Claims**




**1**. A filter arranged to be installed in a tubing connector having first and second sections, the filter comprising:

a hollow base having first and second open ends, a centerline, and first and second wall portions formed between the ends and sloped in opposite directions with respect to the centerline, the wall portions being deformable between a first position in which the wall portions are spaced a first distance from each other before the connector sections are tightened together and a second position in which the wall portions are sealed against the connector sections and spaced a second distance from each other after the connector sections are tightened together, each wall having an inner surface and an outer surface shaped similarly to the inner surface; and

a filter element mounted on the base.

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**5,490,869**

**PROCESS AND DEVICE FOR TREATING POLLUTANT, FUSIBLE MATERIALS**

**Van Den Broek D'Obrenan, Le Chesnay; Nicole Madigou, Montrouge, and Thierry Deriaud, Guebwiller, all of, France, assignors to Promethee, Puteaux; Soretel, Cergy-Pontoise, and Constructions Electriques Celes, Lautenbach, all of, France**

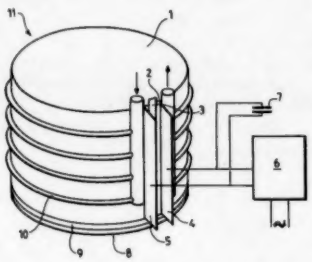
**PCT No. PCT/FR93/00276, § 371 Date Sep. 20, 1994, § 102(e) Date Sep. 20, 1994, PCT Pub. No. WO93/18868, PCT Pub. Date Sep. 30, 1993**

**PCT Filed Mar. 18, 1993, Ser. No. 302,907**

**Claims priority, application France, Mar. 20, 1992, 92 03407**

**Int. Cl.[6] C21B** *3/04*

**U.S. Cl. 75—10.14** **32 Claims**




**1**. Process for treating pollutant materials which are fusible and conductors of electricity in the melted state, which process comprises:

(a) introducing the said materials into an induction furnace comprising an inductor circuit,

(b) directly heating the said materials by induction in said furnace to ensure their melting, the induction being created by the inductor circuit which is galvanically connected to a power source,

(c) removing the melted products from the said furnace, and

(d) cooling the removed products, such that the cooled products are in non-leachable form.

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**5,490,870**

**AMALGAMABLE COMPOSITION AND METHOD OF PRODUCTION**

**Richard W. Fountain, Pinckney, and Kamal Asgar, Ann Arbor, both of Mich., assignors to Special Metals Corporation, New Hartford, N.Y.**

**Continuation-in-part of Ser. No. 142,021, Oct. 28, 1993, Pat. No. 5,354,353. This application Jul. 12, 1994, Ser. No. 274,078**

**Int. Cl.[6] C22C** *7/00*

**U.S. Cl. 75—255** **30 Claims**

**20**. An amalgam formed from the amalgamation of from 30 to 56% of mercury and from 44 to 70% of a multi-component composition which is devoid of cut particles; said multi-component composition, consisting essentially of:

(a) from 30 to 90%, by weight, of a first alloy powder component containing, by weight, at least 30% silver, at least 20% tin and at least 10% copper;

(b) from 5 to 65%, by weight, of a second alloy powder component containing, by weight, at least 30% silver, at least 20% tin and at least 10% copper;

(c) up to 15%, by weight, of a third component consisting essentially of a member selected from the group consisting of silver and alloy powder containing at least 80%, by weight, of silver; and

(d) from 5 to 65%, by weight, of a fourth component, an alloy powder containing, by weight, at least 30% silver, at least 20% tin and at least 10% copper,

wherein said first component is atomized alloy powder, wherein said alloy powder of said first component consists essentially of particles which are substantially spherical in shape, wherein said second component is atomized alloy powder which has been mechanically worked to increase the surface area to volume ratio of its particles, the surface area to volume ratio of the particles of said alloy of said second component being greater than the surface area to volume ratio of the particles of said alloy of said first component and wherein said fourth component is atomized alloy powder, wherein said alloy powder of said fourth component consists essentially of particles which are as atomized substantially irregular in shape, the average length to average width ratio of said irregular particles being at least 1.5 said amalgam having compressive strength, creep and condensation resistance comparable or better to that formed from the amalgamation with mercury of an identical multi-component composition comprised of both spherical and cut particles.

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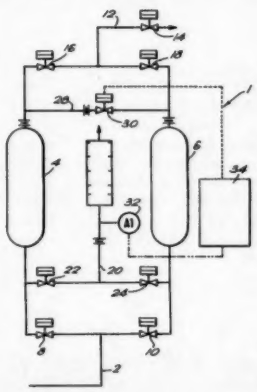
**5,490,871**

## GAS SEPARATION

**John R. Coates, Farnham, and Paul W. Kingston, Sheffield, both of, England, assignors to The BOC Group plc, Windlesham Surrey, England**

**Filed Jan. 28, 1994, Ser. No. 189,008**
**Int. Cl.[6] B01D** *53/047*
**U.S. Cl. 95—23** **3 Claims**



1. A pressure swing adsorption method of producing a product gas from a feed gas mixture including the product gas comprising repeatedly performing a cycle of operations which includes the steps of:

a) contacting the feed gas mixture with a bed of adsorbent material which adsorbs preferentially at least one other component of the feed gas mixture relative to the product gas. thereby producing said product gas as nonadsorbed component;

b) desorbing the bed;

c) purging the bed with said product gas;

d) sensing when the gas leaving the bed during the purging step contains a preselected volume of said product gas; and

e) on reaching the preselected volume stopping the purge step.

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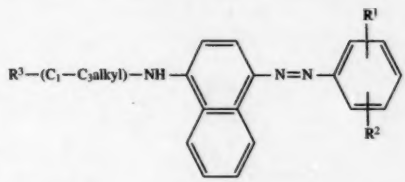
**5,490,872**

## ACID EXTRACTABLE PETROLEUM FUEL MARKERS

**Michael R. Friswell, Wayne, N.J.; Michael J. Hallisy, Woodstock, Ill., and Michael P. Hinton, Neshanic Station, N.J., assignors to Morton International, Inc., Chicago, Ill.**

**Filed Apr. 28, 1994, Ser. No. 234,201**
**Int. Cl.[6] C10L** *1/22*
**U.S. Cl. 44—328** **3 Claims**

1. A method of tagging a liquid petroleum fuel and identifying the tagged petroleum fuel, the method comprising adding to said liquid petroleum fuel a detectable level of a marker having the formula:




where $R^1$ and $R^2$ are selected from H, methyl, ethyl, methoxy, halogen, cyano and nitro and $R^3$ is selected from methyl, methoxy, methoxyethoxy and morpholino, and extracting said marker from said tagged petroleum fuel with an acidic aqueous medium, thereby developing a color.

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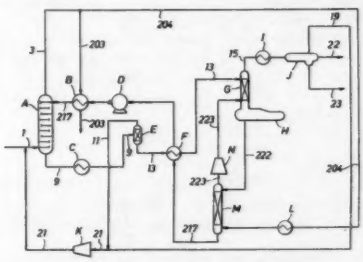
**5,490,873**

## HYDROCARBON EMISSION REDUCTION

**Steven D. Behrens, College Station, and Jerry A. Bullin, Bryan, both of Tex., assignors to Bryan Research & Engineering, Inc., Bryan, Tex.**

**Filed Sep. 12, 1994, Ser. No. 304,232**
**Int. Cl.[6] B01D** *47/06;19/00*
**U.S. Cl. 95—160** **5 Claims**



1. In the process of dehydrating a natural gas stream comprising predominately methane by contact with diethylene glycol in a contacting zone to produce a dried natural gas stream as contacting zone overhead product and a water-rich glycol as contacting zone bottoms product, withdrawing a major portion of the dried natural gas contacting zone overhead product from the process and heating the water-rich glycol at a temperature below the glycol decomposition temperature in a regeneration zone and returning the resulting water-lean glycol to the contacting zone, the improvement of:

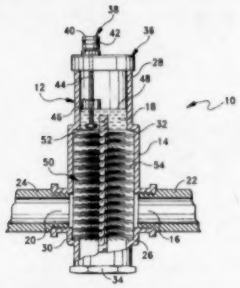
partially condensing the gaseous, water-containing overhead product of the regeneration zone and returning the gaseous portion of the partial condensate to a lower portion of the contacting zone; and

stripping the water-lean bottoms product of the regeneration zone with the remaining dried natural gas contacting zone overhead product in a stripping zone under reduced or equal pressure, passing the gaseous overhead product of the stripping zone to the regeneration zone and returning the glycol-containing bottoms product of reduced water content to the contacting zone.

## 5,490,874
## DE-AERATOR APPARATUS

**Hans L. Kuster, Barrington, and Benno Lebkuchner, Warwick, both of R.I., assignors to Sparco, Inc., Warwick, R.I.**

**Filed Jan. 3, 1995, Ser. No. 367,578**
**Int. Cl.[6] B01D** *19/00*
**U.S. Cl. 96—204** **14 Claims**




**1**. A de-aerator apparatus for removing gas from fluid flowing through a pipe, the de-aerator apparatus comprising:

a housing having a chamber, an inlet connected to an inlet pipe for allowing the passage of fluid into the chamber, an outlet connected to an outlet pipe for discharging fluid from the chamber, and a vent for venting gas from the top of the chamber, the arrangement being such that as fluid flows into the chamber through the inlet and out of the chamber through the outlet, relatively large gas pockets present in the fluid in the chamber rise to the surface of the fluid and exit the chamber through the vent; and

a device positioned within the chamber, said device having bristles facing the flow of fluid into the chamber through the inlet, the bristles vibrating for merging micro gas pockets present in the fluid with other micro gas pockets for forming large gas pockets which rise to the surface of the fluid within the chamber and exit the chamber through the vent.

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## 5,490,875
## ADHESIVE COMPOSITION FOR CIGARETTE SEAMS

**Vilas Wermers, Lemont, Ill., and Michael Romanovich, Cherry Hill, N.J., assignors to American Maize Technology, Inc., Dimmitt, Tex.**

**Filed Jul. 13, 1993, Ser. No. 91,221**
**Int. Cl.[6] C08L** *3/02*
**U.S. Cl. 106—208** **20 Claims**

**1**. An adhesive composition for use as a cigarette seam adhesive comprising a cooked aqueous blend of

(a) about 10 to about 45 parts by weight of a high amylopectin starch dextrin, wherein said high amylopectin starch dextrin has at least about 70% by weight amylopectin and said high amylopectin starch dextrin has a cold funnel viscosity of about 20 to about 120 mls when measured at about 42% solids dry basis,

(b) about 15 to about 60 parts by weight of a high amylopectin starch hydrolysate, wherein said high amylopectin starch hydrolysate has at least about 70% by weight amylopectin and said high amylopectin starch hydrolysate has a Dextrose Equivalent of about 10 to about 30, and

(c) about 20 to about 60 parts by weight water,

(d) said aqueous blend having a Brookfield viscosity of about 500 to about 15,000 cps when measured at a solids content of about 60% by weight, about 20 rpm, and a temperature of about 25° C.

## 5,490,876
## STARCH-BASED ADHESIVE

**Theo W. Warmerdam, Maassluis; Henk G. Nolten, Naaldwijk, both of, Netherlands; Edward W. Day, Middlesex, England; Joseph S. Hetzer, and Anil B. Goel, both of Naperville, Ill., assignors to Reichhold Chemicals, Inc.**

**Filed Nov. 18, 1993, Ser. No. 154,617**
**Int. Cl.[6] C09J** *103/02*
**U.S. Cl. 106—213** **6 Claims**

**1**. A starch-based adhesive composition for use in cigarette manufacturing consisting essentially of:

(a) 5 to 60 percent by weight of a modified starch;

(b) 2 to 25 percent by weight of a dispersible unmodified starch that thickens on heating to a temperature of at least about 50° C.; and

(c) 0.1 to 5 percent of a rheology modifier.

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## 5,490,877
## LOW-VISCOSITY CEMENT COMPOSITION

**Aldo Prevedello, and Goffredo Romano, both of San Donato Milanese, Italy, assignors to Eniricerche S.p.A., and Snamprogetti S.p.A., both of Milan, Italy**

**Division of Ser. No. 130,156, Sep. 30, 1993, abandoned, which is a continuation of Ser. No. 280,558, Dec. 6, 1988, abandoned. This application Aug. 17, 1994, Ser. No. 291,830**
**Claims priority, application Italy, Dec. 18, 1987, 23090 A/87**
**Int. Cl.[6] C09D** *195/00*
**U.S. Cl. 106—668** **16 Claims**

**1**. A method of cementing a bore lining column, comprising:

cementing a bore lining column with a low-viscosity cement composition comprising:

i) cement;

ii) water; and

iii) an additive produced by neutralizing the sulfonated and oxidized products derived from the reaction between sulfur trioxide and fuel oil from steam cracking, with an alkali metal, an alkali earth metal or an ammonium salt.

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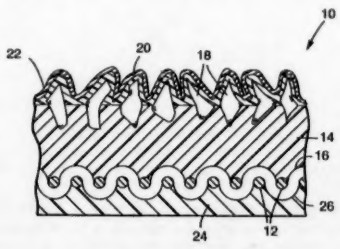
## 5,490,878
## COATED ABRASIVE ARTICLE AND A METHOD OF MAKING SAME

**Jeffrey S. Peterson, Hudson, Wis., and Donald L. Oseth, West St. Paul, Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.**

**Division of Ser. No. 932,073, Aug. 19, 1992, Pat. No. 5,344,688. This application Jun. 30, 1994, Ser. No. 269,194**
**Int. Cl.[6] B24D** *11/02*
**U.S. Cl. 51—295** **18 Claims**




**1**. A method of making a coated abrasive article comprising the steps of:

a. providing a porous backing having a front side and a back side and an interstitial area therebetween, said backing having a porosity sufficient to allow 100 cubic centimeters of air to pass therethrough in less than 100 seconds;

b. applying a radiation curable make coat precursor to the front side of said backing so that said make coat precursor is in direct contact with said backing without substantially penetrating said interstitial area;
c. applying a multiplicity of abrasive grits into said make coat precursor;
d. exposing said make coat precursor to a source of radiation energy to at least partially cure said make coat precursor, whereby the make coat precursor seals the backing and serves to bond the abrasive grits to the backing;
e. applying a size coat precursor over said abrasive grits; and
f. completely curing said make coat and said size coat precursors.

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**5,490,879**

## DEVICE FOR COATING AND/OR IMPREGNATING A CONTINUOUSLY MOVING BAND OF MATERIAL WITH A LIQUID OR PASTY PRODUCT

**Gabriel Corradi, and Thierry Pellegrino, both of Soissons, France, assignors to Societe Anonyme: M. Chemicals, Saint Germain, France**

**Filed Sep. 14, 1993, Ser. No. 121,343**
**Claims priority, application France, Dec. 17, 1992, 92 15665; European Pat. Off., Jun. 29, 1993, 93490013**
**Int. Cl.[6] B05C *1/00***
**U.S. Cl. 118—212** **6 Claims**

1. A device for coating and/or impregnating a continuously moving band of material with a liquid or pasty product comprising:
an application means for depositing a layer of the product on at least partially one face of the band, said application means having a reservoir with a perforated area arranged so as to contact the face of the band as the band is deflected thereabout, said perforated area having a plurality of orifices with one end opening to an exterior surface of said reservoir, said reservoir being a fixed cylinder having at least two feed delimiting means longitudinally displaceable relative to said fixed cylinder of said reservoir, said feed delimiting means for limiting at least one area of coating of the product on the band;
a product feed chamber communicating with an opposite end of said plurality of orifices interior of said application means; and scraping means for scraping the product on the band after the application means deposits the product on the band, said scraping means for scraping the product on the band so as to level the product on the band.

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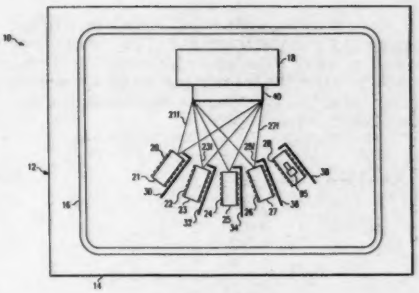
**5,490,880**

## COMPOUND SEMICONDUCTORS AND A METHOD FOR THIN FILM GROWTH

**Yung-Chung Kao, and Francis G. Celii, both of Dallas, Tex., assignors to Texas Instruments, Incorporated, Dallas, Tex.**

**Division of Ser. No. 958,888, Oct. 9, 1992, Pat. No. 5,400,739. This application Dec. 1, 1994, Ser. No. 304,985**
**Int. Cl.[6] C23C *14/00***
**U.S. Cl. 118—665** **7 Claims**

1. A system for growing epitaxy layers on a compound semiconductor substrate, said system comprising:



a vacuum chamber having a substrate holder;
a plurality of cells to hold atomic and/or molecular sources;
means for selectively opening and closing said cells;
a mass spectrometry detector positioned to sense the level of atoms or molecules in said chamber, said detector generating a signal proportionate to said level of atoms or molecules; and
memos for adjusting the flux from said cells and the temperature of said substrate holder in response to said signal.

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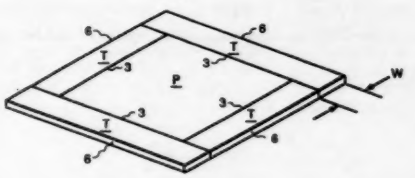
**5,490,881**

## MAINTAINING UNIFORMITY OF DEPOSITED FILM THICKNESS IN PLASMA-ENHANCED CHEMICAL VAPOR DEPOSITION

**Robert F. Kwasnick, 1021 Millington Rd., Schenectady, N.Y. 12309**

**Filed Nov. 2, 1992, Ser. No. 970,201**
**Int. Cl.[6] C23C *16/50***
**U.S. Cl. 118—723 E** **5 Claims**



1. For insertion into a plasma-enhanced chemical vapor deposition chamber, apparatus comprising:
a) an arrangement of glass plates, each of said plates having a surface to be coated and having at least one edge abutting against one edge of at least one other of said plates; and
b) a frame of glass tiles abutting against the peripheral edges of said arrangement of glass plates.

5. For insertion into a plasma-enhanced chemical vapor deposition chamber, an assembly comprising:
a) a rectangular plate comprised of glass having a surface to be coated; and
b) a frame surrounding the plate and comprising four lateral extensions of said plate, each of said extensions being comprised of aluminum and abutting a respective edge of said plate, said frame having an upper surface substantially coplanar with that of the plate so as to substantially avoid electric field discontinuities near said edges.

**5,490,882**

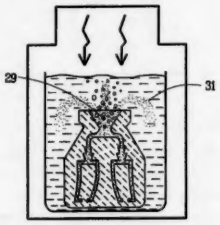
## PROCESS FOR REMOVING LOOSE POWDER PARTICLES FROM INTERIOR PASSAGES OF A BODY

**Emanuel M. Sachs, Somerville; Michael J. Cima, Lexington; James F. Bredt, Watertown, and Satbir Khanuja, Cambridge, all of Mass., assignors to Massachusetts Institute of Technology, Cambridge, Mass.**

**Filed Nov. 30, 1992, Ser. No. 983,156**

**Int. Cl.[6] B08B** *3/10*

**U.S. Cl. 134—1** **6 Claims**




1. A process for removing loose powder particles from interior passages of a body made by a layer manufacturing technique comprising the steps of

placing the body within a bath of liquid; and

applying, to the liquid and the body, microwave energy of a frequency selected to heat the liquid throughout its volume so as to cause the liquid to boil throughout said volume, whereby fluid motion is produced within the interior passages of said body, said motion producing an expulsion of the loose powder particles from substantially all regions within said passages.

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**5,490,883**

## SOLUTION AND METHOD FOR CLEANING MARBLE SURFACES

**Kevin P. McLaren, and Diane M. Scheele, both of Aurora, Ill., assignors to The ServiceMaster Company, L.P., Downers Groves, Ill.**

**Filed Jun. 16, 1994, Ser. No. 260,757**

**Int. Cl.[6] B08B** *1/00;* **C04B** *41/50;* **B24B** *1/00;* **C11D** *7/60*

**U.S. Cl. 134—3** **15 Claims**

1. An aqueous crystallizing solution comprising about 10–15 percent by weight of magnesium silicofluoride, about 0.5–2.0 percent by weight of oxalic acid, and about 0.5–1.5 percent by weight of phosphonic acid.

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**5,490,884**

## METHOD AND SYSTEM FOR EXTRACTING A SOLUTE FROM A FLUID USING DENSE GAS AND A POROUS MEMBRANE

**James R. Robinson, 3326 Dyer Rd., Livermore, Calif. 94550, and Marc J. Sims, 80 The Plaza Dr., Berkeley, Calif. 94705, assignors to Tastemaker; Separation Equipment Technologies, Inc.; Mark Sims, S.F.E.; James R. Robinson, and Marc J. Sims**

**Filed Sep. 9, 1994, Ser. No. 303,445**

**Int. Cl.[6] B01D** *53/22;63/02*

**U.S. Cl. 95—45** **33 Claims**

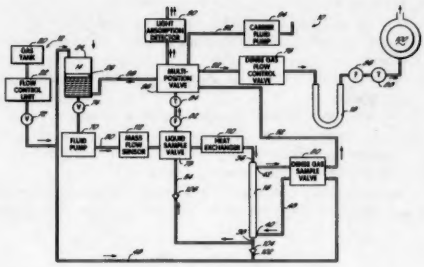
1. A method of extracting a solute from a fluid or a dense gas comprising the steps of:

providing a porous membrane having opposite sides in a module under pressure with said membrane serving as a barrier interface between a fluid and a dense gas, said membrane is nonselective for said solute;

providing said dense gas into said module on one side of said membrane and said fluid on the opposite side of said membrane, where at least one of said fluid and dense gas contains a solute to be extracted, and the other one of said fluid and dense gas serves as an extracting medium, said dense gas having a density of at least about 0.5 g/cc, said fluid and dense gas being essentially immiscible in one another so as to provide two phases;

conducting said method wherein the pressure on both sides of said membrane in said module is essentially the same; and

extracting said solute across said membrane as driven by a concentration gradient of said solute between said fluid and said dense gas.



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**5,490,885**

## METAL TREATMENT

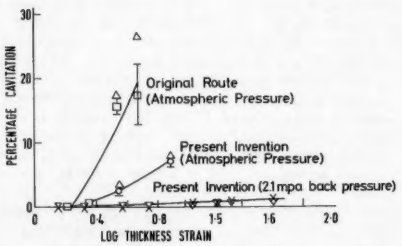
**William S. Miller, Maidstone, and Roger Grimes, Halton, both of, England, assignors to Alcan International Limited, Montreal, Canada**

**Continuation of Ser. No. 776,386, Nov. 21, 1991, abandoned. This application Aug. 3, 1994, Ser. No. 284,298**

**Claims priority, application United Kingdom, Mar. 21, 1989, 8906468**

**Int. Cl.[6] C22F** *1/04*

**U.S. Cl. 148—564** **16 Claims**




1. A method of treating a blank of an aluminium base alloy comprising the steps of hot rolling the blank and thereafter applying a combination of heat treatments and cold forming operations to produce a highly recovered semi-fabricated wrought product which is inherently non-superplastic and is capable of superplastic deformation only after an initial non-superplastic deformation to achieve dynamic recrystallization, wherein said combination comprises at least two said cold forming operations separated by an intermediate annealing step, and wherein said cold forming operations of said combination are such, and said heat treatments of said combination entail temperatures, heating rates and times such that application of said combination substantially avoids recrystallization between the commencement of the first cold forming step and completion of the last cold forming step of the combination, each said cold forming step providing a reduction ratio no greater than 43%.

5,490,886

## METHODS FOR QUENCHING METAL

Douglas G. Placek, Fairless Hills, Pa., assignor to FMC Corporation, Philadelphia, Pa.

Filed Oct. 14, 1994, Ser. No. 324,088
Int. Cl.[6] C21D *1/60*
U.S. Cl. 148—637 11 Claims

1. A method for quenching a hot metal, at least the surface of which is formed from iron, steel or copper or an alloy of iron, steel or copper, which comprises contacting the metal with a quenching fluid comprising a major proportion of an organic phosphate ester.

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5,490,887

## LOW DENSITY WATERGEL EXPLOSIVE COMPOSITION

Don H. Cranney, South Jordan; Lawrence D. Lawrence, Sandy, and Michael M. Jackson, Murray, all of Utah, assignors to Dyno Nobel Inc., Salt Lake City, Utah

Continuation of Ser. No. 16,076, Feb. 10, 1993, abandoned, which is a continuation-in-part of Ser. No. 877,133, May 1, 1992, abandoned. This application Dec. 22, 1993, Ser. No. 171,843
Int. Cl.[6] C06B *45/00;31/28*
U.S. Cl. 149—2 10 Claims

1. A low-density water-gel explosive composition consisting essentially of a continuous phase of aqueous inorganic oxidizer salt solution in which water is present in an amount of from about 10% to about 40% of the composition, ammonium nitrate particles in an amount of from about 10% to about 70% of the composition, a thickening agent, a crosslinking agent, fuel selected from the group consisting of water-miscible fuels, water-immiscible organic liquid fuels and mixtures thereof and a dispersion of chemically produced gas bubbles in an amount sufficient to reduce the density of the composition to less than 0.7 g/cc.

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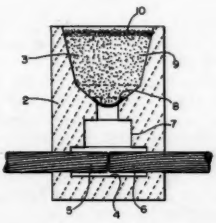
5,490,888

## MIXTURE OF REACTANTS FOR USE IN WELDING

Mark Assel, Cleveland Heights, and James E. Whetsel, Twinsburg, both of Ohio, assignors to Erico International Corporation, Solon, Ohio

Filed Dec. 6, 1993, Ser. No. 163,156
Int. Cl.[6] C06B *33/00*
U.S. Cl. 149—37 15 Claims




1. An exothermic reaction mixture which upon initiation of an exothermic reaction forms a molten weld metal for use in joining a non-ferrous metal piece with at least one other metal piece, said exothermic reaction mixture comprising:

a reducing agent;

a filler metal; and

two or more metallic compounds at least one of which is a Group I metal sulfate, which during said exothermic reaction are reduced by said reducing agent and form a compound with said reducing agent having a heat of formation which provides an exothermic reaction with sufficient heat to melt said filler metal.

5,490,889

## BLENDED HYDRAULIC CEMENT FOR BOTH GENERAL AND SPECIAL APPLICATIONS

William D. Kirkpatrick, and Carole W. Kirkpatrick, both of 1431 S. Ocean Blvd., #10, Pompano Beach, Fla. 33062

Continuation-in-part of Ser. No. 66,702, May 27, 1993, Pat. No. 5,374,308, and Ser. No. 267,590, Jun. 29, 1994, Pat. No. 5,387,283. This application Jan. 20, 1995, Ser. No. 377,355
Int. Cl.[6] C04B *14/04*
U.S. Cl. 106—709 18 Claims

1. A blended hydraulic cement consisting essentially of by weight:

from about 14.52 to 21.77 percent water,

from about 5.00 to 23.00 percent cementitious material,

from about 50.33 to 83.36 percent subbituminous fly ash,

from about 0.07 to 1.25 percent boric acid,

from about 0.15 to 2.80 percent borax,

from about 0 to 8.00 percent ground silica,

from about 0.04 to 2.83 percent citric acid, and

from about 0.04 to 11.00 percent alkali metal activator, selected from the group consisting of: potassium hydroxide, potassium carbonate, sodium hydroxide, sodium carbonate, lithium hydroxide, and lithium carbonate.

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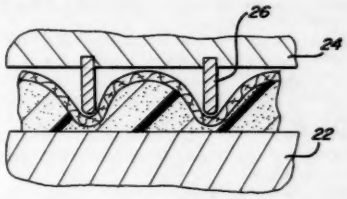
5,490,890

## METHOD FOR MAKING EMBOSSED LAMINATED FOAM ARTICLES

Clark Morrison, West Bloomfield, Mich., assignor to Actex, Madison Heights, Mich.

Continuation of Ser. No. 47,036, Apr. 12, 1993, abandoned, which is a continuation of Ser. No. 797,696, Nov. 25, 1991, abandoned. This application Aug. 29, 1994, Ser. No. 297,411
Int. Cl.[6] B32B *31/20*
U.S. Cl. 156—66 8 Claims




1. A method for making a laminated foam article comprising the steps of:

providing a compressible foam layer;

directly contacting a surface of said foam layer with a layer of cover material selected from the group consisting of natural fabrics and synthetic fabrics to form a bilayer;

placing said bilayer on a platen;

contacting said cover material layer of said bilayer with at least one heated projection at a temperature to rapidly melt the foam at the compressed area, said temperature about 115° C. to 220° C.;

heating said platen to a temperature above ambient and less than said projection and below the melt temperature of said foam;

providing a press including said projection, heating said press and said projection and heating said press to have a temperature at about or slightly greater than the melt temperature of the foam such that the temperature of the projection and the press are different and said press being adjacent said cover material layer;

then producing relative movement of said platen and said press with said heated projection to compress regions of said foam layer adjacent said heated projection;

melting and collapsing said compressed regions of said foam layer using the heat of said projection to bond said layers together and to form permanent embossed lines in said bilayer;

melting said foam layer in the area of the press using the heat of the press to bond said layers together and maintaining the temperatures of the projection and press during melting of said foam layer; and

removing said melted collapsed regions of said foam material.

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**5,490,891**

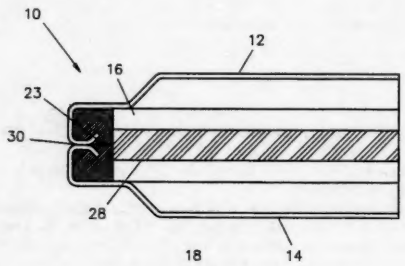
## METHOD OF MANUFACTURING A MEMORY CARD PACKAGE

**Jim Farquhar, Coronado; Ken Dorf, San Jose; Brandt Weibezahn, Pleasanton; Iggoni Fajardo, San Jose, and Charlie Centofante, Hollister, all of Calif., assignors to Duel Systems, San Jose, Calif.**

**Continuation of Ser. No. 92,012, Jul. 15, 1993, Pat. No. 5,397,857. This application Dec. 1, 1994, Ser. No. 348,535**

**Int. Cl.[6] B32B** *31/14*

**U.S. Cl. 156—73.1** **5 Claims**




1. A method of manufacturing a package for a memory card comprising the following steps:

A. Stamping metal covers to a size marginally larger than a mold in an injection molding process;

B. Bending edges of said covers to conform to an intended shape of a frame element, the edges including fingers extending from the cover sides;

C. Inserting the covers into a mold in an injection molding process where they are slightly sprung and thus secure themselves in position;

D. Shooting plastic frame elements into the mold so that fingers included on the covers become embedded in the frames;

E. Removing said covers from said mold;.

F. Positioning a PCB between two covers, the PCB being held in the proper location by means of ejector pins on the plastic frames, the ejector pins being formed as a part of the molding process;

G. Bonding the plastic frame elements together so that a package is formed.

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**5,490,892**

## METHOD OF FABRICATING A COMPOSITE MATERIAL PART, IN PARTICULAR A SANDWICH PANEL, FROM A PLURALITY OF ASSEMBLED-TOGETHER PREFORMS

**Stéphane Castagnos, Carbon Blanc, and Jean-Louis Limousin, Le Plan Medoc, both of, France, assignors to Societe Europeenne De Propulsion, Suresnes, France**

**Filed Feb. 15, 1994, Ser. No. 197,638**

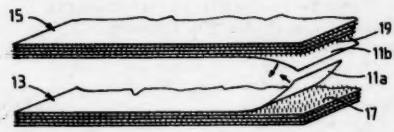
**Claims priority, application France, Feb. 17, 1993, 93 01767**

**Int. Cl.[6] B32B** *5/06;5/12;18/00;* **C01B** *31/00*

**U.S. Cl. 156—89** **14 Claims**

1. A method of fabricating a composite material part, the method comprising the steps of:

providing at least two distinct preforms each corresponding to a respective portion of the part, at least one of the preforms being a fiber preform formed by the step of needling said fiber preform onto a substrate with ends of fibers that have been entrained during needling extending into the substrate;




separating the substrate from the needled preform, thereby providing said ends of fibers as fibrils that project substantially perpendicularly from a surface of the needled preform;

assembling said at least two preforms together while they are in a non-densified state or a state that is not completely densified, with the preforms being assembled together at least in part by means of said fibrils projecting from said surface of the previously needled preform and engaging a contacting surface of the other preform; and

co-densifying the assembled together preforms.

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**5,490,893**

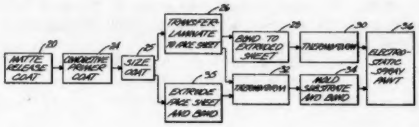
## THERMOFORMABLE CONDUCTIVE LAMINATE AND PROCESS

**Howard H. Enlow, Munster; Scott W. Huffer, Crown Point; Frederick Young, Schererville, and William J. Buehne, Hammond, all of Ind., assignors to Avery Dennison Corporation, Pasadena, Calif.**

**Continuation of Ser. No. 67,527, May 24, 1993, abandoned, which is a continuation-in-part of Ser. No. 887,535, May 22, 1992, abandoned. This application Oct. 3, 1994, Ser. No. 316,818**

**Int. Cl.[6] B44C** *1/165*

**U.S. Cl. 156—230** **28 Claims**




1. A process for making an electrostatic spray painted plastic panel, comprising the steps of:

coating an electrically conductive resinous primer coat on a heat-resistant carrier sheet and drying the primer coat to a uniform film thickness on the carrier sheet said conductive primer coat having a Ransberg resistivity measurement of about 110 units or greater;

transferring the conductive primer coat from the carrier sheet and bonding the transferred conductive primer coat to a flexible, thermoformable plastic sheet;

forming the conductive primer coated sheet into a three-dimensionally shaped contoured substrate panel, in which the conductive primer coat is on the exterior surface of the contoured substrate panel, said conductive primer coat having regions thereof which have been subjected to elongation in forming said contoured substrate panel, the conductive primer coat retaining a Ransberg resistivity measurement of about 110 units or greater following said elongation for providing an electrostatically sprayable surface resistivity level to the contoured exterior surface of the substrate panel; and

applying a finished paint coat to the exterior surface of the elongated conductive primer coat on the contoured substrate panel, in which the finished paint coat is applied by electrostatic spray techniques.

5,490,894

## CLEANING METHOD USING AZEOTROPIC MIXTURES OF PERFLUORO-N-HEXANE WITH DIISOPROPYL ETHER OR ISOHEXANE AND CLEANING APPARATUS USING SAME

**Hirohide Matsuhisa, Yokohama; Satoko Midorikawa, Machida, and Sumire Mima, Tokyo, all of, Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan**

**Division of Ser. No. 183,807, Jan. 21, 1994, Pat. No. 5,431,837. This application Apr. 7, 1995, Ser. No. 418,436**

**Claims priority, application Japan, Jan. 22, 1993, 5-026035; Jun. 4, 1993, 5-158057; Jun. 10, 1993, 5-163788; Dec. 10, 1993, 5-340964**

**Int. Cl.**[6] **B08B** *3/08;5/00;* **B05C** *3/02;9/12*

**U.S. Cl. 134—30** **18 Claims**

1. A cleaning method including the steps of cleaning an article with a solvent, optionally purging or rinsing said article with a solvent, and cleaning and drying said article with solvent vapor, wherein the solvent in any one of the steps is the same as or different from the solvent in any or all of the other steps, and wherein the solvent in at least one of the steps is a mixed solvent composition consisting essentially of 70–85% by weight of perfluoro-n-hexane and 15 to 30% by weight of isohexane, said composition having an azeotropic boiling point of 44° to 48° C. at ambient pressure.

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5,490,895

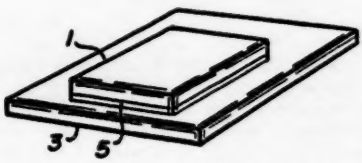
## CERAMIC ALUMINUM LAMINATE AND THERMALLY CONDUCTIVE ADHESIVE THEREFOR

**Mansheng Wang, and Bruce A. Given, both of San Diego, Calif., assignors to TRW Inc., Redondo Beach, Calif.**

**Continuation of Ser. No. 955,807, Oct. 2, 1992, abandoned, which is a division of Ser. No. 541,663, Jun. 21, 1990, Pat. No. 5,180,625, which is a continuation of Ser. No. 189,859, May 3, 1989, abandoned. This application Mar. 14, 1994, Ser. No. 212,336**

**Int. Cl.**[6] **B32B** *27/38;31/20*

**U.S. Cl. 156—286** **12 Claims**




1. A method of heat sinking a ceramic circuit board having a surface of an area of ten square inches or greater to an aluminum sheet to form a heat sinked ceramic circuit board assembly capable of withstanding repeated temperature cycling between −60 degrees C. and +125 degrees C. without breaking or permanent deformation, said method comprising the steps of:

forming an adhesive mixture with said mixture being thermally conductive and having a dielectric constant of at least 3 when measured at 1 MHz, wherein the step of forming the adhesive mixture comprises the steps of:

mixing one part by weight of a first adhesive comprising an amine functional polybutadiene blend, a liquid epoxy Novolac resin, alumina, and a flow control agent and one part hardener to form a first mixture element;

mixing one part by weight of a second adhesive and one part catalyst to form a second mixture element, said second mixing element being a medium viscosity, room temperature curing system capable of being rapidly cured at elevated temperatures; and

mixing one part by weight of said first mixture element with one part by weight of said second mixture element to form said adhesive mixture;

coating said adhesive mixture over at least a portion of said surface of said ceramic circuit board to form a covering layer thereon;

placing an aluminum sheet in contact with the adhesive coated surface of said ceramic circuit board, said aluminum sheet having a surface geometry and area at least as great as said surface of the ceramic board so as to cover said adhesive coated surface of said ceramic circuit board; and

placing the ceramic circuit board and aluminum sheet in a vacuum to maintain the elements thereof at a predetermined contact pressure and a predetermined temperature and maintaining said ambient conditions for a predetermined time to cure said adhesive mixture and form the heat sinked ceramic circuit board assembly.

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5,490,896

## PHOTOMASK OR A LIGHT SHIELDING MEMBER HAVING A LIGHT TRANSMITTING PORTION AND A LIGHT SHIELDING PORTION

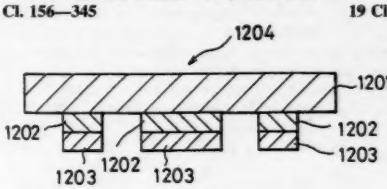
**Takayuki Yagi, Machida; Toshiyuki Komatsu, Hiratsuka; Yasue Sato, Kawasaki, and Shinichi Kawate, Machida, all of, Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan**

**Division of Ser. No. 275,757, Jul. 20, 1994, Pat. No. 5,413,664, which is a division of Ser. No. 13,180, Jan. 29, 1993, Pat. No. 5,344,522, which is a continuation of Ser. No. 696,024, May 6, 1991, abandoned. This application Feb. 28, 1995, Ser. No. 395,472**

**Claims priority, application Japan, May 9, 1990, 2-117644; May 10, 1990, 2-118675; Jun. 10, 1990, 2-158687; Jul. 13, 1990, 2-174443; Nov. 16, 1990, 2-308550**

**Int. Cl.**[6] **H01L** *21/306;* **B44C** *1/22*

**U.S. Cl. 156—345** **19 Claims**




1. A photomask having:

a support capable of transmitting light,

a light-shielding pattern which shields said light, and

a light absorbing member provided corresponding to said light shielding pattern.

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5,490,897

## TIRE FORMER CAPABLE OF EXPANDING AND CONTRACTING IN AN AXIAL DIRECTION

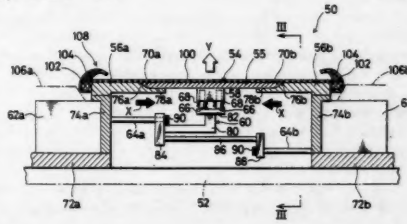
**Yoshinobu Miyanaga, and Kenji Mishima, both of Shirakawa, Japan, assignors to Sumitomo Rubber Industries, Ltd., Japan**

**Filed Jul. 8, 1994, Ser. No. 271,915**

**Claims priority, application Japan, Jul. 14, 1993, 5-174402**

**Int. Cl.**[6] **B29D** *30/24*

**U.S. Cl. 156—415** **8 Claims**



1. A tire former for use in a tire building apparatus, the tire former comprising:

a shaft;

a center ring provided coaxially around the shaft and radially expandable, wherein the center ring includes a plurality of ring segments separatable from one another in a circumferential direction of the center ring;

a pair of side rings provided coaxially around the shaft, the side rings being movable closer to and away from each other along the shaft to selectively provide:

an axially expanded state where the side rings are positioned on opposite sides of the center ring and an outer circumferential surface of the side rings is flush with an outer circumferential of the center ring; and

an axially contracted state where the side rings are positioned radially inside of the center ring;

a pair of sliders slidably mounted on the shaft for supporting the pair of side rings respectively; and

guide means provided between the pair of sliders for guiding the axial movement of the pair of side rings, wherein the guide means is provided for each ring segment, and the guide means includes:

a stationary rod extending in parallel with the shaft and having a first block and a second block on opposite ends thereof;

a first rod attached on one slider and extending in parallel with the shaft, the first rod passing through the first block for slidably supporting the first block; and

a second rod attached on the other slider and extending in parallel with the shaft, the second rod passing through the second block for slidably supporting the second block.

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**5,490,898**

## COATING FILM TRANSFER TOOL

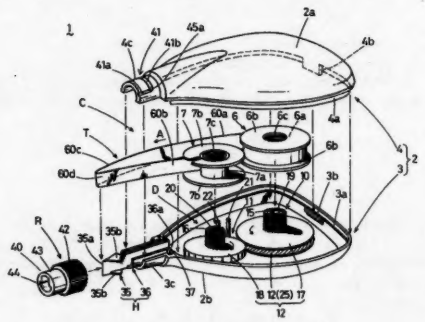
**Kouhei Koyama, Osaka, Japan, assignor to Seed Rubber Company Limited, Osaka, Japan**

**Filed Aug. 17, 1994, Ser. No. 291,853**

**Claims priority, application Japan, Sep. 22, 1993, 5-259320**

**Int. Cl.[6] B44C** *7/02*

**U.S. Cl. 156—540** **18 Claims**



1. A coating film transfer tool comprising:

operating means configured and dimensioned for allowing hand-held operation by one hand;

tape pay-out means detachably provided in the operating means for paying out a coating film transfer tape for supply;

tape pressing means projecting from a front end of the operating means for pressing the coating film transfer tape supplied by the tape pay-out means against a transfer area; and

tape collecting means detachably provided in the operating means for collecting the coating film transfer tape guided through a pressing part in a front end of the tape pressing means after it is used,

wherein the tape pressing means is rotative between a coating film transfer tape replacement position and an application position; and

the pressing part in the front end of the tape pressing means guides the coating film transfer tape in a same attitude as it is wound about the tape pay-out means and tape collecting means in the coating film transfer tape replacement position, and such that the coating film transfer tape faces approximately directly to gripping surfaces of the operating means in the application position.

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**5,490,899**

## DEVICE FOR THE PRE-SEALING OF A DOCUMENT TO A PLASTIC BAND

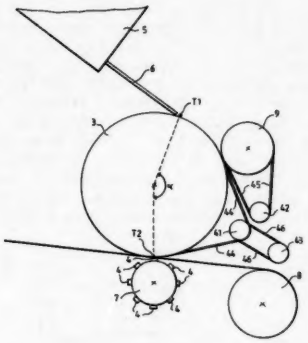
**Georges Tisserand, La Ferte Gaucher, and Jacques Tisserand, Chelles, both of, France, assignors to Idmatics S.A., Colombes, France**

**Filed Mar. 29, 1994, Ser. No. 219,449**

**Claims priority, application France, Apr. 2, 1993, 93 03898**

**Int. Cl.[6] B32B** *31/10*

**U.S. Cl. 156—552** **9 Claims**



1. A device for the pre-sealing of a document to a plastic band, said device comprising:

a first cylinder on which the document is wound from a first point of space tangential to the first cylinder; and

means to affix the document to the plastic band at a second point tangential to the first cylinder where the plastic band is in contact with the document, a constant angle $\alpha$ being formed between a first line extending from a center of the first cylinder to the first tangential point and a second line extending from the center of the first cylinder to the second tangential point, the document being pre-sealed by the affixing of the plastic band to the second tangential point;

wherein, with the document being printed on a sheet, the sheet being wound on the first cylinder from the first tangential point, a cutter cylinder cuts the document out by pressure on the first cylinder, the cutter cylinder comprising a cutter line that is then pressed to the sheet;

the device further comprising:

extraction means to extract remains of the sheet, the extraction means being formed by a set of extraction cylinders and a plurality of sets of belts, at least one first set of belts being housed in the first cylinder and being driven by a first extraction cylinder to move the remains of the sheet away from the first cylinder, a second set of belts being driven by the cutter cylinder and a second extraction cylinder keeping the cut-out document on the first cylinder.

5,490,900
**IN-LINE APPLICATIONS OF FACING FOILS TO PARTICLE BOARDS**

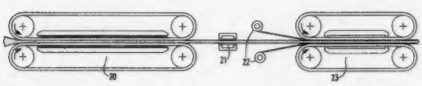
**Kurt Held, Alte Strasse 1, 78647 Trossingen, Germany**

**Filed Mar. 30, 1994, Ser. No. 220,118**

**Claims priority, application Germany, Apr. 1, 1993, 43 10 685.4**

**Int. Cl.[6] B30B** *5/06;15/34*

**U.S. Cl. 156—555** **10 Claims**



**1.** An apparatus for the continuous manufacture of particle boards provided with cover foils, comprising: an isochoric-double band press in which a continuous particle board is manufactured, a grinding station with a grinding crystal carrier sheet arranged adjacent said isochoric double band press and engaging the surface of said particle board as it leaves said isochoric double band press with a rocking motion normal to the movement of the particle board for roughening the surface thereof, a foil unrolling station for placing a foil onto said particle board after it, is roughened in said grinding station and an isobaric double band press disposed adjacent said foil unrolling station and receiving said particle board with said foil placed thereon, said isobaric double band press heating and compressing said particle board for attachment of said foil to the particle board surface during its movement through said isobaric double band press.

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5,490,901
**METHOD FOR FORMING A CONTACT HOLE IN A SEMICONDUCTOR DEVICE**

**Heon D. Kim, Bubaleub, Rep. of Korea, assignor to Hyundai Electronics Industries Co., Ltd., Rep. of Korea**

**Filed Mar. 15, 1994, Ser. No. 213,168**

**Claims priority, application Rep. of Korea, Mar. 15, 1993, 1993-3949**

**Int. Cl.[6] B44C** *1/22*

**U.S. Cl. 156—643.1** **5 Claims**

**1.** A method for forming contact holes in contact regions in a semiconductor device comprising the steps of:

forming a plurality of first conducting films;

depositing a first insulating film on said first conducting films;

forming a plurality of second conducting films on said first insulating film, wherein the first distance between said first conducting films is less than the second distance between said second conducting films;

depositing a second insulating film to a thickness on said second conducting films;

forming a first mask pattern on said second insulating film, wherein said first mask pattern has first contact areas which do not expose said second conducting films;

a primary etching of a portion of said second insulating film by use of said first mask pattern, such that the possibly largest area of the second insulating film is etched in so far as said second conducting films are not exposed, thereby reducing topology at an upper portion of contact regions;

removing said mask pattern;

forming a second mask pattern having second contact areas which do not expose said first conducting films and are less than those of said first contact areas, said second contact areas being located in contact regions;

a secondary etching of first and second insulating films by use of said second mask, thereby forming contact holes in the contact regions; and

removing said second mask pattern.

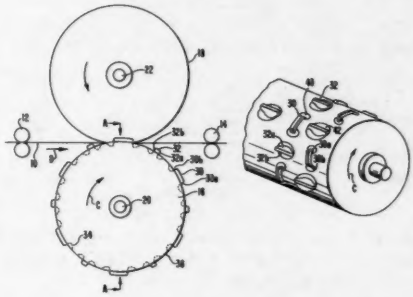
5,490,902
**STRENGTH CONTROL EMBOSSING AND PAPER PRODUCT PRODUCED THEREBY**

**Galyn A. Schulz, Appleton, Wis., assignor to James River Corporation of Virginia, Richmond, Va.**

**Division of Ser. No. 577,119, Sep. 4, 1990, Pat. No. 5,383,778. This application Oct. 18, 1994, Ser. No. 324,619**

**Int. Cl.[6] D21H** *27/02;* **B31F** *1/07;1/18*

**U.S. Cl. 162—109** **8 Claims**



**1.** A method for embossing a web to modify the strength of said web, in which the web has a first tensile strength in a machine direction and a second tensile strength in a cross-machine direction, the method comprising:

feeding a web in a machine direction;

passing the web through embossing means to emboss said web by engaging said web with protruding means provided on said embossing means, said embossing means including a surface and said protruding means having non-uniform heights such that first portions of said protruding means protrude more deeply into said web than second portions of said protruding means, wherein said first portions extend to a greater height from the surface of said embossing means than said second portions, said first portions extending in one of the machine direction or the cross machine direction and said second portions extending in the other of the machine direction or the cross machine direction such that the tensile strength of said web is weakened to a greater extent in the direction in which said second portions extend such that the ratio of the tensile strength in said machine direction to the tensile strength in the cross-machine direction is closer to 1:1 after the embossing than the ratio prior to embossing.

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5,490,903
**CREPING CHEMICAL COMPOSITION AND METHOD OF USE**

**Franklin M. C. Chen, Appleton, and Frank G. Druecke, Oshkosh, both of Wis., assignors to Kimberly-Clark Corporation, Neenah, Wis.**

**Division of Ser. No. 291,804, Aug. 17, 1994, Pat. No. 5,468,796. This application Mar. 6, 1995, Ser. No. 399,278**

**Int. Cl.[6] B31F** *1/12*

**U.S. Cl. 162—111** **15 Claims**

**1.** A method of making a creped tissue comprising the steps of:

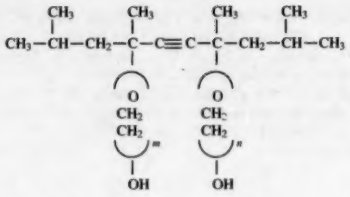
(a) depositing an aqueous suspension of papermaking fibers onto a forming fabric to form an embryonic web;

(b) dewatering and drying the embryonic web to form a tissue web;

(c) applying a creping adhesive to the surface of a creping cylinder;

(d) adhering the tissue web to the creping cylinder; and

(e) dislodging the tissue web from the creping cylinder with a doctor blade to form a soft tissue sheet, wherein the creping adhesive comprises from about 0.05 to about 20 dry weight percent of an ethoxylated acetylenic diol having the formula:



wherein the sum of m+n is from about 1 to about 10.

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**5,490,904**

## STRENGTH RESINS FOR PAPER

**Roger H. Jansma, Park Forest; A. James Begala, Naperville, and Gary S. Furman, St. Charles, all of Ill., assignors to Nalco Chemical Company, Naperville, Ill.**

**Division of Ser. No. 210,408, Mar. 18, 1994, Pat. No. 5,401,810, which is a continuation of Ser. No. 837,970, Feb. 20, 1992, abandoned. This application Oct. 5, 1994, Ser. No. 318,577**

**Int. Cl.[6] D21H *17/45***

**U.S. Cl. 162—168.2** **7 Claims**

**1**. A method for preparing paper having improved wet strength which comprises:

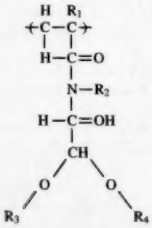
a. forming a cellulosic slurry;

b. adding to the cellulosic slurry an effective wet strength increasing amount of hydrolyzed polymer, said polymer having the structure prior to hydrolysis of:

(A)a(X)b(Y)c

wherein A is an acetal containing mer unit, X is a cationic mer unit, and Y is acrylamide, "a" is the mole percentage of A in said polymer and is a value of from about 20 to about 80; "b" is the mole percentage of X in said polymer and is a value of from about 0 to about 30; "c" is the mole percentage of Y in said polymer and is a value of from about 1 to about 80;

wherein said acetal-containing met unit has the structural formula of



wherein $R_1$ is hydrogen, methyl or ethyl; $R_2$ is hydrogen, methyl, or ethyl; and $R_3$ and $R_4$ are either each independently an alkyl having from 1 to about 5 carbon atoms or together contain from about 2 to about 10 carbons and form a cyclic acetal together with the —O—CH—O groups;

c. forming said cellulosic slurry into a fiber mat; and

d. drying said fiber mat to form a paper having an improved wet strength.

**5,490,905**

## METHOD IN THE REGULATION OF A MULTI-LAYER HEADBOX AND A MULTI-LAYER HEADBOX

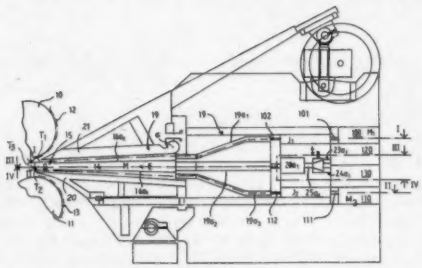
**Jyrki Huovila, Muurame; Petri Nyberg, and Michael Odell, both of Jyväskylä, all of, Finland, assignors to Valmet Paper Machinery, Inc., Helsinki, Finland**

**Filed Jun. 30, 1994, Ser. No. 269,348**

**Claims priority, application Finland, Jul. 1, 1993, 933030**

**Int. Cl.[6] D21F *1/06***

**U.S. Cl. 162—212** **20 Claims**



**1**. A method for regulating a total pulp flow from a headbox, comprising the steps of:

passing at least a first, second and third component flow having certain pulp properties from said headbox to form a first, second and third layer of a web, respectively, said second component flow being situated intermediate of said first and third component flows, and

regulating the pulp properties of said second component flow in a direction transverse to the direction of said second component flow to provide different pulp properties at different locations in the transverse direction of said second component flow without regulating the pulp properties of said first and third component flows in a direction transverse to the direction of said first and third component flows, respectively, the pulp properties of said second component flow being regulated by

forming said second component flow from a plurality of component subflows arranged in the transverse direction of said headbox,

regulating the rate of at least one of said component subflows, and

regulating the concentration of said at least one of said component subflows independently from the regulation of the rate of said at least one of said component subflows,

whereby the pulp properties of the total headbox pulp flow is regulated.

**11**. The method of claim **1**, further comprising the step of independently regulating each of said component subflows.

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**5,490,906**

## FLUID DISTILLATION APPARATUS

**Naisin Lee, 2105 Louis Rd., Palo Alto, Calif. 94303**

**Continuation-in-part of Ser. No. 615,945, Nov. 20, 1990, abandoned, which is a division of Ser. No. 456,080, Dec. 22, 1989, Pat. No. 4,976,824, which is a continuation of Ser. No. 207,572, Jun. 16, 1988, abandoned. This application May 11, 1992, Ser. No. 881,407**

**Int. Cl.[6] B01D *3/34*; C02F *1/04***

**U.S. Cl. 202—172** **8 Claims**

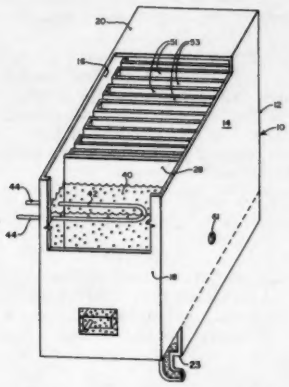
**1**. Apparatus for distilling a fluid comprising:

a housing having an outer wall defining a hollow space therewithin;

means near the bottom of the housing for forming a reservoir for receiving condensed fluid vapor;

a first chamber in the housing for receiving fluid to be heated;

heater means in the first chamber near the upper level of the fluid thereof for heating the fluid to a boiling temperature



whereby the fluid will form a vapor which will move out of the chamber to a space adjacent to the fluid level;

means for channeling the vapor from the first chamber to the reservoir;

means for defining a second chamber adjacent to the first chamber and free of a heater, said second chamber adapted to contain fluid to a level below the fluid level of the first chamber; and

aerator means in the housing for aerating the fluid in said chambers.

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**5,490,907**

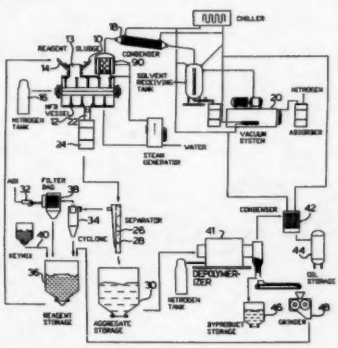
**METHOD FOR TREATING SLUDGES**

**Peter Weinwurm, and Paul S. Weinwurm, both of Brampton, Canada, assignors to Agglo Inc., Rexdale, Canada**

**Continuation-in-part of Ser. No. 703,944, May 22, 1991, abandoned, which is a continuation-in-part of Ser. No. 299,979, Jan. 23, 1989, Pat. No. 5,087,375. This application Oct. 12, 1993, Ser. No. 134,436**

**Int. Cl.[6] B01D** *3/10;15/00*

**U.S. Cl. 203—29** **14 Claims**



1. A method for the separation and recovery of volatile solvents from an organic sludge containing about 1 to 95% by weight volatile liquid solvents and 5 to 99% by weight solids, comprising: feeding said sludge containing the volatile liquid solvents and a reagent powder material in an amount effective to form a mixture having a high surface area to a distillation vessel, heating said mixture to a temperature up to about 350° C. while advancing said mixture through the vessel for a time sufficient to distill a sufficient portion of the volatile solvents to yield a solid residue powder, condensing distilled solvents, and separately recovering the solid residue powder.

**5,490,908**

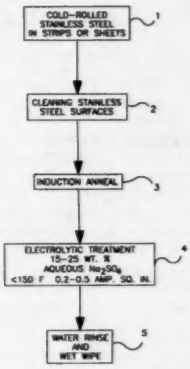
**ANNEALING AND DESCALING METHOD FOR STAINLESS STEEL**

**Yeong-U Kim, Export; Donald R. Zaremski, Cheswick, and Carol S. Hertzler, Monroeville, all of Pa., assignors to Allegheny Ludlum Corporation, Pittsburgh, Pa.**

**Filed Jul. 11, 1994, Ser. No. 273,385**

**Int. Cl.[6] C25F** *1/06*

**U.S. Cl. 148—241** **10 Claims**




1. The method of processing cold rolled stainless steel in the form of a strip or a sheet, said method comprising:

cleaning the surface of said stainless steel with a solution selected from the group consisting of water and an aqueous solution of alkaline and acid-based compounds in amounts sufficient to reduce oxide scale formation and to provide a more uniform scale thickness during subsequent annealing, thereafter;

subjecting said stainless steel to transverse-flux electrical-induction heating substantially uniformly across its width to an annealing temperature in the range of up to 2300 degrees Fahrenheit, thereby producing on said steel an oxide-scale having a relatively uniform thickness of about 1200 Angstroms or less; and

electrolytically descaling said stainless steel by subjecting it to the action of a bath of an electrolyte of an aqueous solution of at least one neutral salt from the group consisting essentially of chloride, sulfate, and nitrate of an alkali metal or ammonium maintained at a temperature in excess of 150 degrees Fahrenheit and with the use of current density of about 0.1 to 1.0 amperes per square inch for a time sufficient to descale the steel substantially entirely.

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**5,490,909**

**USE OF CAPILLARY ELECTROPHORESIS FOR QUANTITATING THE CONCENTRATION OF PROTEIN COMPONENTS AND OF THE TOTAL PROTEIN IN FLUIDS**

**Hann-Ping Wang, and Cheng-Ming Liu, both of Yorba Linda, Calif., assignors to Beckman Instruments, Inc., Fullerton, Calif.**

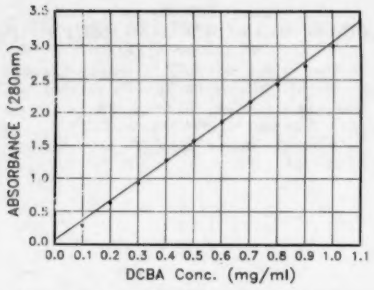
**Continuation of Ser. No. 133,514, Oct. 7, 1993, abandoned. This application Jun. 14, 1995, Ser. No. 489,252**

**Int. Cl.[6] B01D** *57/00*

**U.S. Cl. 204—452** **28 Claims**

1. A method for quantitating albumin comprising the steps of:

(a) adding a known quantity of an internal standard compound to a sample containing albumin, the internal standard compound selected from the group consisting of dichlorobenzoic acid and trichlorobenzoic acid and producing a detector signal in relation to its concentration and being capable of electrophoretic separation from albumin;




(b) subjecting the sample and the internal standard compound to capillary electrophoresis to separate the albumin and internal standard compound from each other and from other components in the sample;

(c) measuring the detector signal produced by the internal standard compound and a detector signal produced by the albumin to determine a ratio of albumin signal to internal standard signal; and

(d) determining the concentration of the albumin in the sample from a standard curve of protein concentration versus the ratio of albumin signal to internal standard signal.

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**5,490,910**

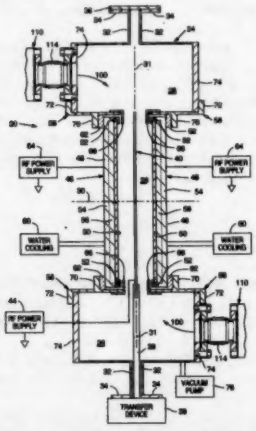
**CIRCULARLY SYMMETRIC SPUTTERING APPARATUS WITH HOLLOW-CATHODE PLASMA DEVICES**

**Carl W. Nelson, Hayward, and Richard D. Weir, Agoura Hills, both of Calif., assignors to Tulip Memory Systems, Inc., Fremont, Calif.**

**Continuation of Ser. No. 101,403, Aug. 3, 1993, abandoned, which is a continuation-in-part of Ser. No. 848,251, Mar. 9, 1992, Pat. No. 5,232,569. This application Mar. 6, 1995, Ser. No. 400,137**

**Int. Cl.[6] C23C** *14/34*

**U.S. Cl. 204—192.15** **21 Claims**



1. A sputtering apparatus for depositing electrically conductive or insulating thin films on substrates, said apparatus comprising:

a process chamber having therein a central sputtering region and an annular plasma distribution region surrounding and open to the central sputtering region, wherein both the central sputtering region and the annular plasma distribution region are substantially free from externally-applied magnetic fields;

two planar disk diodes positioned in the central sputtering region of the process chamber and each having a sputtering target facing the central sputtering region, wherein the sputtering targets may be composed of either conductive or insulating material;

positioning means for positioning a substrate within the central sputtering region adjacent to the planar disk diode; and

plasma generation means for supplying plasma to the annular plasma distribution region of the process chamber from two symmetrically-positioned plasma sources for diffusion into the central sputtering region of the process chamber to create a substantially uniform plasma therein.

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**5,490,911**

**REACTIVE MULTILAYER SYNTHESIS OF HARD CERAMIC FOILS AND FILMS**

**Daniel M. Makowiecki, Livermore, and Joseph B. Holt, San Jose, both of Calif., assignors to The United States of America as represented by the Department of Energy, Washington, D.C.**

**Filed Nov. 26, 1993, Ser. No. 157,497**

**Int. Cl.[6] C23C** *14/34*

**U.S. Cl. 204—192.15** **18 Claims**

1. A process for fabricating hard ceramic material, comprising:

forming a multilayer structure of a plurality of alternating layers of a reactive metal and material selected from the group of carbon, boron, and aluminum; and

reacting the thus formed multilayer structure to produce dense crystalline ceramic material.

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**5,490,912**

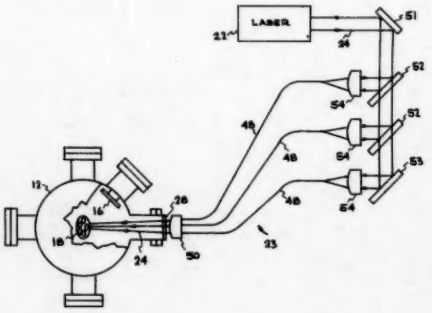
**APPARATUS FOR LASER ASSISTED THIN FILM DEPOSITION**

**Bruce E. Warner, Pleasanton, and William McLean, II, Oakland, both of Calif., assignors to The Regents of the University of California, Oakland, Calif.**

**Filed May 31, 1994, Ser. No. 251,129**

**Int. Cl.[6] C23C** *14/34*

**U.S. Cl. 204—298.02** **56 Claims**




1. An apparatus for producing a thin film of a target material on a substrate, comprising:

a laser source producing a visible output beam;

a chamber;

a fiber optic delivery system including a distal end coupled to the laser source, and a proximal end positioned adjacent to the chamber to deliver the output beam to the target material in the chamber;

a target support positioned in the chamber; and

a substrate support positioned in the chamber.

## 5,490,913
## MAGNETIC FIELD ENHANCED SPUTTERING ARRANGEMENT WITH VACUUM TREATMENT APPARATUS

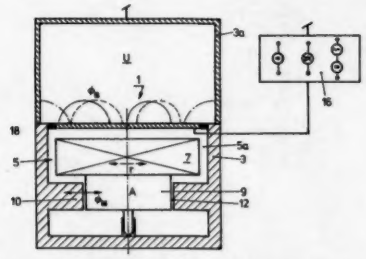
**Roman Schertler, Wolfurt, Austria; Walter Haag, Grabs, and Peter Kohler, Malans, both of, Switzerland, assignors to Balzers Aktiengesellschaft, Balzers, Liechtenstein**

**Filed May 2, 1994, Ser. No. 236,535**

**Claims priority, application Switzerland, May 4, 1993, 1362/93**

**Int. Cl.[6] C23C** *14/35*

**U.S. Cl. 204—298.2** **20 Claims**



**1**. A magnetic field enhanced sputtering arrangement comprising:

an arrangement housing (**3**) having a front face;

a target arrangement (**1**) mounted to the front face of the arrangement housing;

a magnet carrier arrangement (**5**) rotatably supported about an axis with respect to the arrangement housing, and generating a flux ($\Phi_R$) which penetrates through a region of the mounted target arrangement (**1**), the region being shifted through a relative rotational motion between the carrier and target arrangements; and

an electric motor drive (**9**, **10**) with a drive housing non-rotatably connected to the arrangement housing (**3**), and with a rotor rotatably supported in the drive housing, which rotor, in turn, acts upon the magnet carrier arrangement (**5**); wherein

the drive housing forms the arrangement housing (**3**) and the rotor (**9**) is non-rotatably connected to the magnet carrier arrangement (**5**).

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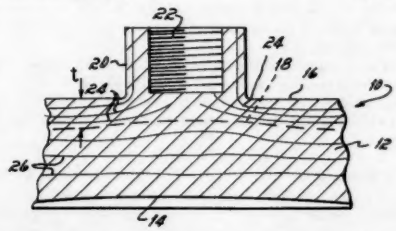
## 5,490,914
## HIGH UTILIZATION SPUTTERING TARGET FOR CATHODE ASSEMBLY

**Steven Hurwitt, Park Ridge, N.J., and Corey Weiss, Monsey, N.Y., assignors to Sony Corporation, Tokyo, Japan, and Materials Research Corporation, Orangeburg, N.Y.**

**Filed Feb. 14, 1995, Ser. No. 388,205**

**Int. Cl.[6] C23C** *14/34*

**U.S. Cl. 204—298.12** **28 Claims**



**1**. A sputtering target for a cathode assembly comprising:

a disk having a front sputtering face and a rear face opposite said sputtering face, said sputtering face and target material eroding during use to define a final sputtered face contour and a residual target thickness t measured from said rear face;

a hub projecting from said rear face of said disk and being adapted to be secured to the cathode assembly;

said disk and hub being forged from a single starting slug of target grade material, said slug having an initial height to diameter ratio such that the flow lines developed in displaced target material during forging which turn upward from said disk into said hub are located at a depth of said target material measured from said rear face which minimizes the thickness t in a region adjacent said hub so as to maximize the amount of said target grade material sputterable in said region before encountering the flow lines which turn upward from said disk into said hub;

said target thereby reducing the labor and amount of scrap normally attendant the machining of a target having an integral hub from a single flat piece of material, increasing the utilization of said target grade material and providing a target having superior sputtering properties near the center of the target.

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## 5,490,915
## TARGET FOR CATHODE SPUTTERING APPARATUS

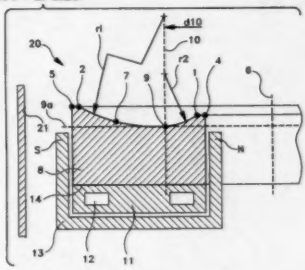
**Bernhard Bracher, Balzers, Germany, assignor to Balzers AG, Balzers, Liechtenstein**

**Filed Jun. 16, 1994, Ser. No. 260,538**

**Claims priority, application Germany, Jul. 15, 1993, 9310565 U**

**Int. Cl.[6] C23C** *14/35*

**U.S. Cl. 204—298.18** **2 Claims**



**2**. A vacuum coating apparatus comprising:

a vacuum coating chamber for receiving a vacuum to perform a vacuum coating operation;

a sputtering target including a ring shaped body made of a metal selected from the group consisting of aluminum and aluminum alloy, the body having a target surface with an inner target rim, an outer target rim, and a ring shaped curved and substantially concave sputtering surface between the linear and outer target rims;

the curved substantially concave sputtering surface having a cross-sectional shape which is curved and edge-free, within an interval between the linear and outer target rims, the curvature of the concave sputtering surface being selected to substantially avoid all growing of layers and redeposition of material sputtered from the sputtering target, back onto the target surface;

the inner target rim being lower than the outer target rim;

said concave sputtering surface includes a lowest point with respect to the higher one of the inner and outer target rims, the lowest point having a given depth below the higher outer target rim, and the lower inner target rim, the sputtering surface having an average diameter between the inner and outer target rims, the depth being about 3 to about 20% of the average diameter and the lower inner target rim being lower than the outer target rim by about up to 6% of the average diameter;

the lowest point being on a low point diameter which is up to about 40 percent smaller than the average diameter, the concave sputtering surface having a curvature which is substantially in the form of an outer circle segment between the

lowest point and the outer target rim, and an inner circle segment between the lowest point and the inner target rim, the inner and outer circle segments having respective first and second radii each including a center, the center of each of the first and second radii lying on a common line which extends through the low point diameter, the sputtering target having a central axis, the common line extending substantially parallel to the central axis; and

magnetic field generating means for generating a magnetic field, said magnetic field generating means having inner and outer poles which extend from a back side surface of the body, along respective inner and outer lateral target surfaces and toward the sputtering surface.

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**5,490,916**

**CAPILLARY REFERENCE HALF-CELL**

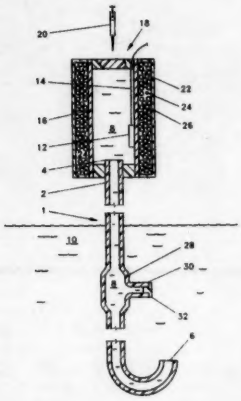
**Stephen H. Hall, Kennewick, Wash., assignor to Battelle Memorial Institute, Richland, Wash.**

**PCT No. PCT/US93/03568, § 371 Date Aug. 12, 1994, § 102(e) Date Aug. 12, 1994, PCT Pub. No. WO94/06003, PCT Pub. Date Mar. 17, 1994**

**PCT Filed Apr. 14, 1993, Ser. No. 290,764**

**Int. Cl.[6] G01N *27/26***

**U.S. Cl. 205—775** **18 Claims**




1. A capillary reference half-cell for immersion into a test solution liquid, comprising:

(a) a capillary having a length further having a portion of an amount of reference solution liquid therewithin,

(b) said capillary constraining said portion of reference solution liquid from free flow volume discharge and said capillary having a first and second end, said first end further having a closure, said second end open, thereby forming at least one liquid junction between said reference solution liquid and said test solution liquid, and permitting diffusion between said reference solution liquid and said test solution liquid, and

(c) an electrode element placed in contact with said reference solution liquid nearer said first end than to said second end wherein a voltage potential is related to a chemical concentration of said reference solution liquid, said voltage potential is constant while diffusion occurs until the diffusion dilutes said reference solution liquid near said electrode element so that a time in service depends upon the length of the capillary.

**5,490,917**

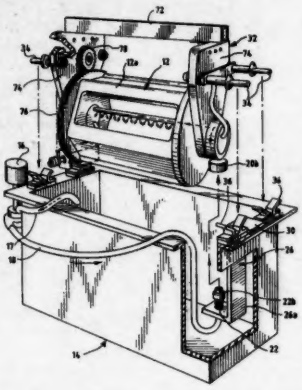
**ELECTROPLATING DEVICE & PROCESS**

**Anton E. Lazaro, Park Ridge, Ill., and William Yates, Las Vegas, Nev., assignors to Hardwood Line Manufacturing Co., Chicago, Ill.**

**Continuation-in-part of Ser. No. 149,442, Nov. 9, 1993, Pat. No. 5,419,823. This application Nov. 10, 1994, Ser. No. 337,083**

**Int. Cl.[6] C25D *17/20***

**U.S. Cl. 205—143** **22 Claims**




22. A method of spraying a plurality of parts to be plated in a plating barrel that is operatively associated with a plating tank containing electrolyte, said barrel including a perforated spray means that sprays electrolyte on the parts below said spray where the barrel can be moved to removably associate it with a source of electrolyte under pressure and can be rotated while the hub thereof remains stationary by a coupling device wherein at least one of the coupling members is associated with said barrel and extending therefrom in a fixed location with respect to said barrel, the other of said coupling members is located at a fixed position to enable removable engagement with said other coupling member, comprising the steps of:

(a) moving the electroplating barrel into a position where it is removably coupled with the source of electrolyte under pressure;

(b) agitating the parts to be plated in the plating barrel by rotating the plating barrel; and

(c) spraying the parts with said electrolyte through the perforated spray means from a fixed position above said parts within the plating barrel while said barrel agitates the parts whereby more efficient electroplating is accomplished.

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**5,490,918**

**SLUDGE DISPOSAL PROCESS**

**Thomas D. Meek, Sedro-wooly, Wash., assignor to Texaco Inc., White Plains, N.Y.**

**Continuation of Ser. No. 48,693, Apr. 16, 1993, abandoned, which is a continuation of Ser. No. 628,071, Dec. 17, 1990, abandoned, which is a continuation of Ser. No. 301,577, Jan. 25, 1989, abandoned. This application Nov. 22, 1994, Ser. No. 343,211**

**Int. Cl.[6] C10G *9/14***

**U.S. Cl. 208—131** **5 Claims**

1. A process for deodorizing, sterilizing and disposing of odor producing petroleum sludge or industrial waste and to produce a sanitized and deodorized petroleum coke, said process consisting essentially of disposing of and sanitizing and deodorizing said odor producing petroleum sludge or industrial waste by mixing said sludge or waste with steam and utilizing said mixture during a portion of a steam cooling step of a three stage cooling procedure of hot coke in a delayed petroleum coke process said three cooling

stages comprising a) the sludge or waste and steam mixture cooling stage, b) an intermediate water to steam cooling stage, and c) a liquid water cooling stage wherein the hot coke is at a temperature above 725° F.; wherein the mixture of steam and sludge or waste is injected during the said steam cooling step after coke drum vapors are diverted to a delayed coke blowdown/vapor recovery system thus exposing the mixture of steam and petroleum sludge or waste to steam distillation or "stripping" just prior to entering and while inside the coke drum and to thermal decomposition once deposited on the hot coke.

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**5,490,919**

## PROCESS FOR THE DEHALOGENATION OF ORGANIC COMPOUNDS

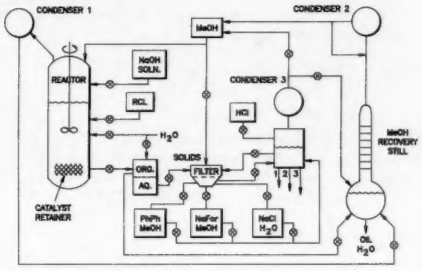
**Ilan Pri-Bar, Omer; David Azoulay, Beer-Sheva, and Ouri Buchman, Omer, all of, Israel, assignors to State of Isreal, Atomic Energy Commission, Israel**

**Continuation of Ser. No. 891,225, May 29, 1992, abandoned, which is a continuation-in-part of Ser. No. 567,276, Aug. 14, 1990, Pat. No. 5,141,629. This application Jun. 27, 1994, Ser. No. 266,969**

**The portion of the term of this patent subsequent to Aug. 25, 2009, has been disclaimed.**

**Int. Cl.[6] C10G** *19/02;27/00*

**U.S. Cl. 208—262.1** **12 Claims**




**1**. A process for the dehalogenation of organohalides wherein an organohalide or a mixture of two or more organohalides is brought into contact with an alkali hydroxide in an alcoholic solution and in the presence of a catalytically effective amount of a heterogeneous transfer hydrogenolysis catalyst, the process being carried out without the introduction of gaseous hydrogen in excess of that contained in the ambient atmosphere.

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**5,490,920**

## SELF-CLEANING SEDIMENTATION UNIT

**Joseph Fruchtbaum, Houston, and Frederick B. Kronmiller, Tomball, both of Tex., assignors to The M. W. Kellogg Company, Houston, Tex.**

**Filed Sep. 22, 1994, Ser. No. 310,819**

**Int. Cl.[6] B01D** *21/18*

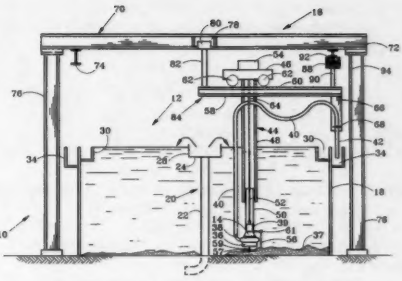
**U.S. Cl. 210—112** **20 Claims**

**1**. A sedimentation unit for gravity separation of suspended solids from a liquid, comprising:

a basin having an inlet for introducing a liquid containing suspended solids, a bottom area for accumulating settled solids from the liquid, and a liquid outlet for discharging liquid reduced solids content;

a pump, having an agitator mounted on a common shaft with an impeller of the pump for rotation therewith, and the agitator is spaced below the impeller, for pumping a slurry of the accumulated solids to a slurry discharge from the basin;

a horizontal traverse with a drive for moving the traverse over the basin;



a pump suspension for supporting the pump from the traverse and vertically positioning the pump with respect to the traverse;

a motorized trolley for supporting the pump suspension from the traverse and adapted to move and reciprocate the pump suspension along a length of the traverse;

a solids detector for sensing a presence or absence of solids adjacent a suction of the pump; and

a controller adapted to activate the pump when the solids detector senses the presence of the solids adjacent the pump suction.

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**5,490,921**

## TWO WATER PURIFYING, RECIRCULATING AND HEATING APPARATUS

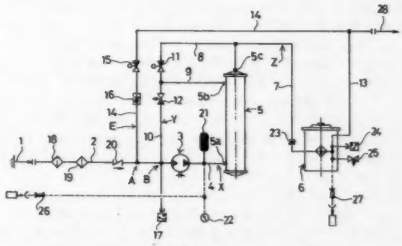
**Tadashi Ishimura, and Syouji Adachi, both of Tokyo, Japan, assignors to Kioritz Corporation, Tokyo, Japan**

**Filed Apr. 25, 1994, Ser. No. 233,038**

**Claims priority, application Japan, Apr. 30, 1993, 5-028588 U**

**Int. Cl.[6] B01D** *61/16*

**U.S. Cl. 210—149** **1 Claim**



**1**. A water purifying and heating apparatus comprising a pump, a purification filter, and a boiler;

a water supply conduit connected to an inlet of said pump, an outlet conduit from said pump to an inlet of said purification filter;

a main conduit extending from a purified water outlet of said purification filter to an inlet of said boiler;

a secondary conduit extending from said main conduit to a junction with a soil conduit extending from said purification filter and a circulation conduit, the junction being downstream of a timer controlled cock on said secondary conduit;

said circulation conduit intersecting said water supply conduit forming a second junction therewith, there being a thermostat at said second junction; and conduit means comprising

a hot water supplying conduit extending from the outlet of said boiler and connected to said water supply conduit downstream of a hot water supply cock and a flow regulator valve on said hot water supplying conduit;

both said hot water supply cock and flow regulator valve being controlled according to water temperature at the junction of said water supply conduit and said circulating conduit so that

hot water is supplied to said water supply conduit in order to control the temperature of water to be supplied to said purification filter.

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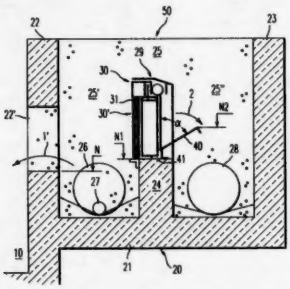
**5,490,922**
**WASTE WATER PLANT WITH BUILT-IN MESH SCREEN UNIT**

**Louis Gresa, Hinwil, Switzerland, assignor to Romag Rohren und Maschinen AG, Dudingen, Switzerland**

**PCT No. PCT/EP93/02594, § 371 Date Jul. 20, 1994, § 102(e) Date Jul. 20, 1994, PCT Pub. No. WO94/07585, PCT Pub. Date Apr. 14, 1994**
**PCT Filed Sep. 24, 1993, Ser. No. 240,765**
**Claims priority, application Switzerland, Sep. 25, 1992, 3015/92**
**Int. Cl.[6] B01D** *77/01*
**U.S. Cl. 210—159** **13 Claims**



1. Waste water plant, comprising a discharge basin (**20**, **120**), connected to at least one inflow pipe (**26**; **126**) and at least one outflow pipe (**28**, **128**),

a mesh screen unit (**30**, **130**), which is disposed in said discharge basin and which includes a mesh screen having parallel screen bars and a cleaning car, which is movable back and forth and to which is attached a cleaning comb, which is arranged with teeth located between the screen bars of the mesh screen,

a partition (**24**, **124**), positioned within the discharge basin (**20**; **120**) and subdividing the discharge basin into an inflow space (**25'**; **125'**) and an outflow space (**25"**; **125"**) wherein the mesh screen unit (**30**; **130**) is attached to the upper edge of the partition (**24**; **124**) such that the mesh screen unit is one of standing upright and upwardly inclined from a vertical plane at an angle of less than 90° and

a damming element increasing the volume of impoundment and arranged in the direction of flow behind the mesh screen unit (**30**; **130**), said damming element having an upper edge which lies above the lower edge of the mesh screen unit.

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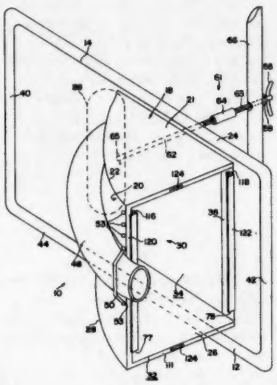
**5,490,923**
**SKIMMER**

**Bruce B. Penney, 9 Milburn Street, Rynfeld, Benoni, Transvaal, South Africa**

**Filed Sep. 19, 1994, Ser. No. 308,333**
**Claims priority, application South Africa, Apr. 21, 1994, 94/2751**
**Int. Cl.[6] E04H** *3/16*
**U.S. Cl. 210—169** **6 Claims**

1. A reservoir skimmer which includes:

a base having an outlet opening which base is generally flat and sufficiently large to entirely cover an outlet including a weir in a side wall of a reservoir, and a deflection member extending from the front of the base, the deflection member forming an upright front wall at least a part of which curves convexly outwardly with an inlet opening defined between the front wall and the base, the front wall for extending into a liquid



circulating in the reservoir to deflect some of the liquid and floating debris to enter through the inlet opening and exit through the outlet opening to subsequently proceed over the weir, provided with a roof between the top edges of the front wall and the base and a floor between the bottom edge of the front wall and the base to form an enclosed channel between the inlet and outlet openings and a weir plate closing off a part of the inlet opening extending upwards from the floor and between the front wall and the base.

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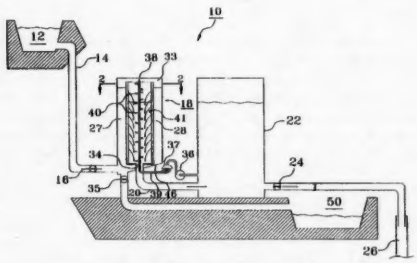
**5,490,924**
**FILTRATION SYSTEM**

**Narciso F. Macia, and Richard A. Pyde, both of Tempe, Ariz., assignors to Control Systems Innovations, Inc., Tempe, Ariz.**

**Filed Jul. 20, 1994, Ser. No. 277,619**
**Int. Cl.[6] B01D** *29/68*
**U.S. Cl. 210—257.1** **9 Claims**



1. A novel system for removing particulate matter from a contaminated fluid source, said system comprising:

a filter tank having an inlet and an outlet, said inlet adapted to receive a stream of contaminated fluid from the source and deliver said stream to said tank, said inlet being disposed substantially tangentially relative to said filter tank;

a cylindrically shaped filter frame operatively mounted within said tank and operatively interposed between said inlet and said outlet;

a mesh filter screen mounted to said filter frame and circumscribed thereabout to define a cylindrical filter assembly therewith, said filter assembly coacting with said filter tank to define an annulus about said filter frame, said annulus coacting with said inlet to direct said stream of contaminated fluid tangentially of and through said filter screen;

a filter cleaning assembly for spraying cleaning fluid through said filter screen, said filter cleaning assembly having an

upstanding central pipe disposed within said filter frame in coaxial relationship thereto, said pipe having a plurality of discrete

nozzles mounted thereupon in axially spaced relationship to each other and at a plurality of radial angles such that said cleaning fluid may simultaneously be sprayed at a plurality of radial angles against said filter screens;

means for selectively reciprocating and rotating said pipe;

a storage tank operatively connected to said filter tank and adapted to receive and hold a flow of filtered fluid from said outlet;

pump means operatively interposed between said storage tank and said central pipe and selectively actuatable to deliver said cleaning fluid from said storage tank to said central pipe and through said nozzles into and through said filter screen.

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**5,490,925**

## ASSEMBLY FOR THE ON-LINE FLUSHING AND FILLING OF AN EXTRACORPOREAL BLOOD CIRCULATION SYSTEM OF DIALYSIS MACHINES

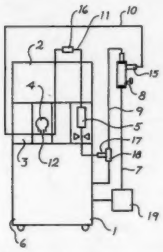
**Hans-Günter Eigendorf, Bad Saarow-Pieskow, Germany, assignor to Medical Support GmbH, Rodgau, Germany**

**Division of Ser. No. 892,792, Jun. 1, 1992, Pat. No. 5,259,961. This application Jul. 7, 1993, Ser. No. 88,833**

**Claims priority, application Germany, Mar. 13, 1992, 42 08 274.9**

**Int. Cl.[6] B01D** *36/00;61/30;61/28;65/02*

**U.S. Cl. 210—321.69** **8 Claims**



1. A dialysis machine assembly having an internal flushing and filling facility for a blood flow circuit of the assembly, said dialysis machine assembly comprising a dialyzer having a membrane, a first inlet and a first outlet in said dialyzer on one side of the membrane, a first blood tube connected to said first inlet and a second blood tube connected to said first outlet, a second inlet and a second outlet in said dialyzer on the other side of the membrane, a dialysis liquid supply means for providing dialdysis liquid under pressure into said second inlet and through said second outlet and forming a dialysis liquid circuit, sterile filter means upstream of said second inlet for assuring a germ-free state of dialysis liquid entering said second inlet, a valve means in said dialysis liquid circuit located downstream of said second outlet, and means for at least partially closing said valve means and forcing dialysis liquid to flow through the membrane to provide a sterile liquid passing out of said first inlet and outlet and through said first and second blood tubes to flush and fill the blood flow circuit prior to performing a dialysis treatment with said dialysis machine.

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**5,490,926**

## SPIRAL-WOUND FILTRATION CARTRIDGE WITH LONGITUDINAL BYPASS FEATURE

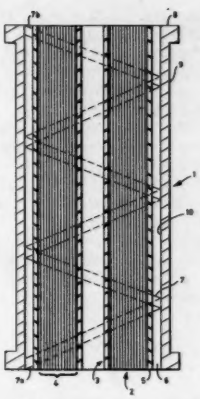
**Michael Hammeken, West Newbury, Mass., assignor to W.R. Grace & Co.-Conn., New York, N.Y.**

**Filed Oct. 31, 1994, Ser. No. 332,013**

**Int. Cl.[6] B01D** *27/06*

**U.S. Cl. 210—321.74** **8 Claims**

1. A spiral filtration cartridge comprising



a) a spirally-wound inner filtration assembly having an impermeable outer cylindrical surface and a ridge integrally formed in said outer impermeable cylindrical surface;

b) a housing having a cylindrical cavity formed therein for receiving said inner filtration assembly, said cylindrical cavity having an inner cylindrical surface;

c) a cavity between said inner and outer surfaces; and

d) at least one continuous longitudinally-oriented fluid pathway disposed between said spirally-wound inner filtration assembly and said housing, said fluid pathway allowing for a portion of a fluid entering one end of said filtration cartridge to bypass said spirally-wound inner filtration assembly and proceed to the other end of said filtration cartridge, and wherein said ridge is in intimate contact with said inner cylindrical surface, thereby providing said continuous longitudinally-oriented fluid pathway.

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**5,490,927**

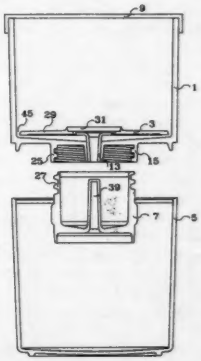
## FILTRATION APPARATUS WITH MEMBRANE FILTER UNIT

**Attila E. Herczeg, Concord, Mass., assignor to Filtron Technology Corporation, Northborough, Mass.**

**Filed Jan. 4, 1995, Ser. No. 368,473**

**Int. Cl.[6] B01D** *63/00*

**U.S. Cl. 210—321.84** **20 Claims**



1. A filtration apparatus for separating filtrate and concentrate from a solution comprising;

a housing having a discharge opening therein and being capable of containing a liquid solution therein;

a filter unit insertable within the housing having a first side and an opposing second side, wherein the first side of the filter

unit faces in the same direction as the discharge opening of the housing, the filter unit comprising,

a semipermeable membrane located on the first side and capable of separating filtrate and retentate,

a gap between the filter unit and the housing wall to allow passage of the solution to be filtered,

at least one filtrate inlet to said discharge opening located on the first side, wherein the semipermeable membrane covers the at least one inlet,

a filtrate port located on the first side and being in fluid flow relationship with the at least one inlet, wherein the filtrate port is oriented to allow filtrate flowing therethrough to flow into the discharge opening of the housing; and

means for sealing the filter unit to the housing for preventing concentrate within the housing from flowing within the discharge opening.

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**5,490,928**

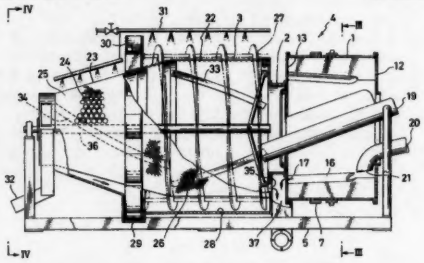
**TANDEM WATERWHEEL TROMMEL**

**Masao Tanii, Kumamoto, Japan, assignor to Tanii Indusries Co., Ltd., Kumamoto, Japan**

**Filed Oct. 17, 1994, Ser. No. 323,542**

**Int. Cl.[6] B07B** *1/22*

**U.S. Cl. 210—380.3** **2 Claims**



**1**. A tandem waterwheel trommel apparatus comprising:

a main body formed by integrally coupling a laterally-disposed drain-off drum and a classifying drum by a pipe, said main body having a front end and a rear end, said drain-off drum disclosed toward said front end and said classifying drum disposed toward said rear end;

a base provided under said main body to rotatably support said main body;

a drive unit provided on said base and connected to said main body to rotate said main body;

a front end plate and a rear end plate each having a generally toroidal shape and respectively formed at opposite ends of said drain-off drum;

a plurality of buckets formed on an inner surface of said drain-off drum said buckets each having an advancing side facing the direction of rotation of said drain-off drum, a trailing side facing away from the direction of rotation of said drain-off drum, and an inner end portion disposed inwardly away from said drain-off drum inner surface;

gutters provided on said trailing side of said inner end portions of said buckets;

drain holes formed in said rear end plate so as to communicate with said gutters to provide fluid communication between the outside of said main body and said gutters;

overflow holes formed in said rear end plate proximate said drain holes;

a fixed chute provided inside said drain-off drum, extending to said classifying drum and inclined so as to be reduced in level from said drain-off drum to said classifying drum;

said classifying drum having a front cylindrical portion and a rear truncated-cone portion disposed so that said front cylindrical portion is generally between said drain-off drum and said rear truncated-cone portion, said truncated-cone portion being formed by a porous plate defining its circumferential surface, said cylindrical portion being formed by wire netting defining its circumferential surface;

a fixed bath for partially accommodating said classifying drum, said fixed bath having a circular-arc shape in a transverse section and having a bath front end portion and a bath rear end portion, with said bath front end portion disposed closer to said drain-off drum than said bath rear end portion is disposed to said drain-off drum;

said cylindrical portion having on its outer surface a screw rotatable in said fixed bath;

said fixed bath having a channel formed in its bath rear end portion, said channel having a circular-arc shape in a transverse section;

scoop-up buckets provided on said classifying drum and formed so as to be rotatable in said channel; and

a spraying nozzle provided above said classifying drum.

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**5,490,929**

**CLEANER FOR ATOMIZER**

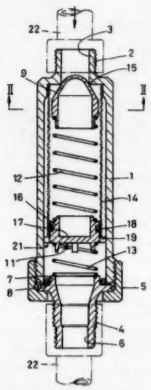
**Kenzo Yamamoto, Wakayama, Japan, assignor to Yamaho Giken Kabushiki Kaisha, Wakayama, Japan**

**Filed Jun. 27, 1994, Ser. No. 266,483**

**Claims priority, application Japan, Jun. 30, 1993, 5-160678**

**Int. Cl.[6] B01D** *24/40;29/17*

**U.S. Cl. 210—430** **2 Claims**



**1**. A cleaner for an atomizer comprising a case having an inlet at one end thereof and an outlet at the other end thereof, a conical valve body mounted in said case, a valve seat formed near said inlet, a spring accommodated in said case for urging said valve body against said valve seat, a mesh filter having both ends open and fitted around said valve body and said spring, a spring seat mounted in said case for supporting one end of said spring, said mesh filter having one end thereof abutting said valve seat and the other end blocked by said spring seat, said spring seat being formed with a liquid passage therearound so as to communicate with said outlet.

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**5,490,930**

**FILTER**

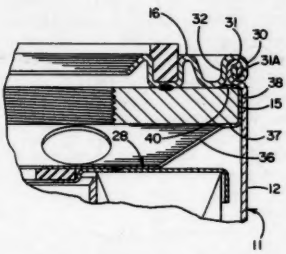
**Timothy L. Krull, Kearney, Nebr., assignor to Baldwin Filters, Inc., Kearney, Nebr.**

**Filed Sep. 27, 1994, Ser. No. 314,516**

**Int. Cl.[6] B01D** *35/30*

**U.S. Cl. 210—443** **15 Claims**

**9**. A filter comprising a canister having an open end, a closed end, and a longitudinally extending sidewall, said sidewall having an end portion adjacent said open end and having a radially inwardly deformed portion located near said open end, an end cover having an outer edge portion interlocking with said end




portion of said sidewall, a baseplate secured to said end cover and located in said open end of said canister adjacent said inwardly deformed portion and between said inwardly deformed portion and said closed end, a tubular filter element located in said canister, an end cap secured to said filter element, and a spacer secured to said end cap said spacer having a first portion extending longitudinally between said baseplate and said sidewall and having a second portion extending radially inwardly from said first portion wherein said second portion engages and is trapped between said inwardly deformed portion of said sidewall and said baseplate.

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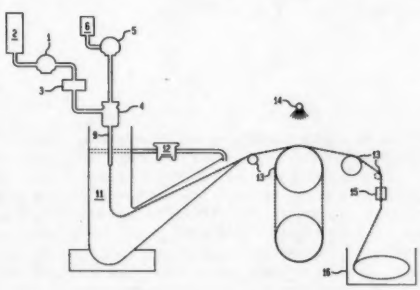
**5,490,931**

**FABRICATION OF A FLUOROPOLYMER HOLLOW FIBER HAVING A DEFECT-FREE SEPARATION LAYER**

**Tai-Shung Chung, Randolph; Edward R. Kafchinski, Winfield, and Michael Haubs, Chatham, all of N.J., assignors to Hoechst Celanese Corp., Somerville, N.J.**

**Continuation of Ser. No. 840,374, Feb. 24, 1992, abandoned.**
**This application Dec. 17, 1993, Ser. No. 170,650**
**Int. Cl.[6] B01D** *69/08*
**U.S. Cl. 210—500.23** **3 Claims**



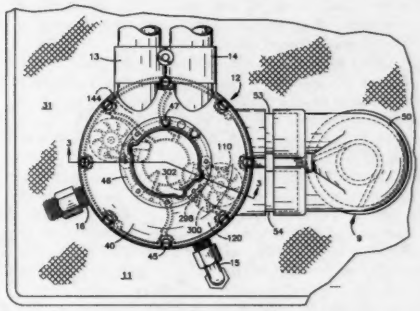

1. An asymmetric hollow fiber for fluid separation having an outer surface and an inner surface, said fiber comprising a fluoropolymer having a solubility at 25° C. in acetone that is no greater than about 20 percent, wherein said inner surface is a dense, essentially defect-free layer and said outer surface is porous, and further wherein said fiber has a separation factor of at least about 4 for oxygen and nitrogen; said fiber made by spinning a dope comprising said fluoropolymer and a solvent from a hollow fiber die using water as a hollow fiber core solvent, and immersing said fiber in coagulation bath comprising a water-acetone mixture, wherein said fiber does not pass through an air gap between said die and said bath.

**5,490,932**

**FLUID TREATMENT VALVE SYSTEM WITH NOZZLE DRIVEN TURBINE**

**Christopher L. Hansen, Newbury, and Stuart L. Park, Burton, both of Ohio, assignors to Kinetico Incorporated, Newbury, Ohio**

**Filed Apr. 1, 1994, Ser. No. 222,077**
**Int. Cl.[6] B01D** *17/12*
**U.S. Cl. 210—541** **22 Claims**




1. A control valve for controlling a water treatment apparatus, the improvement comprising:

a) a water usage turbine rotatably mounted within a water receiving chamber, said turbine including a plurality of vanes;

b) a first nozzle for directing water flowing along a first path, into an impinging relationship with vanes of said turbine;

c) a second nozzle for directing water flowing along a second path into an impinging relationship with said vanes concurrently with said first nozzle, when said second nozzle is operative;

d) structure within said chamber for mounting a plug member, said plug member when mounted in said control valve being operative to block the flow of water along said second path whereby all water is caused to flow through said first nozzle.

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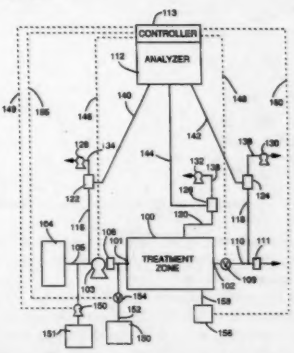
**5,490,933**

**SELF-REGULATED BIOLOGICAL SCRUBBER AND/OR GAS STRIPPER FOR THE TREATMENT OF FLUID STREAMS**

**Mark A. LaPack; Terry J. Nestrick; William F. Martin, and Gary M. Klecka, all of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.**

**Continuation of Ser. No. 680,663, Apr. 4, 1991, abandoned.**
**This application Mar. 17, 1994, Ser. No. 210,108**
**Int. Cl.[6] C02F** *3/00;1/44*
**U.S. Cl. 210—603** **12 Claims**




1. A process for treating a liquid stream comprising:

(a) introducing into a treatment zone at a first volumetric flow rate a liquid influent stream containing at least one constituent which may be reduced in concentration by a biodegradation treatment, the influent stream being characterized by a first mass flow rate of each of the constituents introduced;

(b) treating the influent stream in the treatment zone to reduce the concentration of the at least one constituent by biodegrading with an effective biomass;

(c) discharging from the treatment zone a liquid effluent stream at a second volumetric flow rate, the effluent stream being characterized by a second mass flow rate of each of the constituents or by-products thereof;

(d) making an on-line determination of the first mass flow rate of at least one constituent and the second mass flow rate of the constituent or a by-product thereof; and

(e) adjusting at least one of either the first mass flow rate or the second mass flow rate in response to the determination of step (d).

**9**. A process for treating a liquid stream in conjunction with a biodegradation treatment, the process comprising the steps of:

(a) introducing into a treatment zone at a first volumetric flow rate a liquid influent stream containing at least one constituent which may be reduced in concentration by a gas stripping treatment, the influent stream being characterized by a first mass flow rate of each of the constituents introduced;

(b) treating the influent stream in the treatment zone to reduce the concentration of the at least one constituent by gas stripping,

(c) discharging from the treatment zone a liquid effluent stream at a second volumetric flow rate, the effluent stream being characterized by a second mass flow rate of each of the constituents or by-products thereof;

(d) making an on-line determination of the first mass flow rate of at least one constituent and the second mass flow rate of the constituent or a by-product thereof; and

(e) adjusting at least one of either the first mass flow rate or the second mass flow rate in response to the determination of step (d).

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**5,490,934**

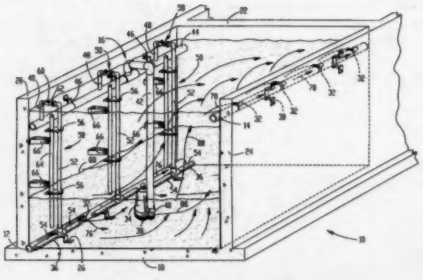
## METHOD OF BIOLOGICAL DENITRIFICATION

**Lawrence A. Schmid, 3107 Harahay Ridge, Manhattan, Kans. 66502, assignor to Lawrence A. Schmid, Manhattan, Kans.**

**Continuation of Ser. No. 113,248, Aug. 30, 1993, abandoned. This application Jun. 6, 1995, Ser. No. 468,515**

**Int. Cl.[6] C02F** *3/28*

**U.S. Cl. 210—614** **6 Claims**



**1**. An anoxic wastewater denitrification process comprising the steps of:

continuously supplying to the bottom of a tank influent wastewater including a relatively small concentration of biomass and a fraction of nitrates;

retaining in the tank a volume of wastewater having a biomass concentration greater than the influent biomass concentration by initially allowing solids introduced with the influent wastewater into the tank to settle while liquid passes through the suspension of solids in the tank, and delivering from the top of the tank effluent wastewater including a biomass concentration less than the biomass concentration in the influent wastewater so that the biomass concentration in the tank increases to a level 2–3 times greater than the biomass concentration in the influent wastewater;

providing biological denitrification of the wastewater as the wastewater moves upward through the tank;

continuously delivering from the top of the tank effluent wastewater including a biomass concentration substantially less than the biomass concentration in the tank, the effluent wastewater being substantially free of nitrates relative to the influent wastewater;

intermittently mixing the wastewater in the tank to increase the biomass concentration in the effluent wastewater and to maintain the biomass in suspension within the tank.

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**5,490,935**

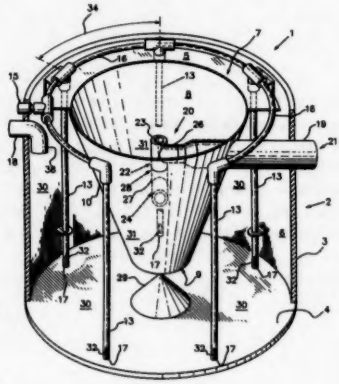
## METHOD FOR TREATING WASTEWATER

**Monroe W. Guy, 3924 Lake Sherwood Ave. E., Baton Rouge, La. 70816**

**Filed Jan. 11, 1994, Ser. No. 180,122**

**Int. Cl.[6] C02F** *3/02*

**U.S. Cl. 210—620** **7 Claims**



**1**. A method for treating wastewater in an apparatus comprising a cylindrical tank having a sidewall, a bottom, an upper portion and a lower portion; a hopper positioned within said tank, said hopper having sides, an upper opening located in said upper portion at a point above a desired water level within said tank and a lower opening located in said lower portion of said tank, said hopper sides diverging from said lower opening to said upper opening, said lower opening being smaller than said upper opening; a compressed air source; at least five radially spaced air outlet pipes, each said air outlet pipe being fluidly connected to said compressed air source and extending downward into said lower portion of said tank and having an open end positioned above said bottom between said hopper and said sidewall of said tank so as to discharge air into an aeration zone between said hopper and said tank sidewall; an inlet line connected to said tank and having a discharge end opening into said tank between said hopper and said tank sides; and an outlet line having an inlet end positioned within said hopper in said upper portion of said tank and an outlet end exterior of said tank, said method comprising:

continuously aerating wastewater within said tank through said air outlet pipes with a sufficient volume of air and sufficiently large bubbles such that said wastewater is continuously agitated within said tank exterior of said hopper so as to eliminate any quiescent zones within said aeration zone.

**5,490,936**

## PROCESS FOR CATALYST RECOVERY

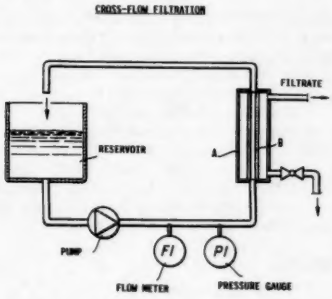
**Ernst I. Leupold, Neu-Anspach; Wolf-Dietmar Kaufmann, Kronberg; Bernd Laugwitz, Kelkheim/Taunus; Günther Duchatsch, Liederbach, and Ulrich Meyer-Blumenroth, Idstein, all of, Germany, assignors to Hoechst Aktiengesellschaft, Germany**

**Continuation of Ser. No. 937,889, Nov. 23, 1992, abandoned. This application Apr. 7, 1994, Ser. No. 224,066**

**Claims priority, application Germany, Apr. 14, 1990, 40 12 128.3**

**Int. Cl.[6] B01D** *61/16*

**U.S. Cl. 210—636** **11 Claims**




**1**. Process for the recovery of catalyst in the preparation of ether-carboxylic acids by catalytic oxidation using a suspended catalyst, characterized in that the reaction mixture is treated with hydrogen and subjected to a cross-flow filtration in the presence of a solubilizer and the filtration is carried out at temperatures from about 20° to 150° C., and producing a resulting concentration of the catalyst in the filtrate of less than 0.5 ppm.

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**5,490,937**

## TANGENTIAL FLOW FILTRATION PROCESS AND APPARATUS

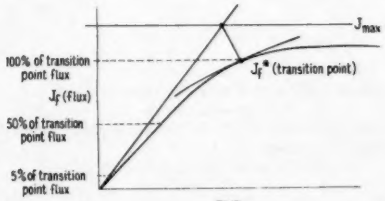
**Robert D. van Reis, Redwood City, Calif., assignor to Genentech, Inc., South San Francisco, Calif.**

**Continuation of Ser. No. 91,945, Jul. 15, 1993, abandoned, which is a continuation of Ser. No. 583,886, Sep. 17, 1990, Pat. No. 5,256,294. This application Jul. 6, 1994, Ser. No. 271,223**

**The portion of the term of this patent subsequent to Oct. 26, 2010, has been disclaimed.**

**Int. Cl.[6] B01D** *61/22*

**U.S. Cl. 210—637** **12 Claims**




**12**. A process for separating at least two proteins or polypeptides from each other that are contained in a mixture, wherein the proteins or polypeptides differ from each other in molecular weight by less than ten fold, which process comprises filtering the mixture by tangential-flow filtration through a filtration membrane having a pore size that separates the polypeptides or proteins from the mixture, while maintaining flux at a level ranging from about 5 to 100% of transition point flux in the pressure-dependent region of the flux versus TMP curve, whereby the proteins or polypeptides are selectively separated from the mixture, and wherein transmembrane pressure decreases or remains approximately constant as the filtration progresses.

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**5,490,938**

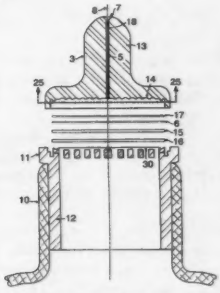
## LIQUID DISPENSER FOR STERILE SOLUTIONS

**Samuel P. Sawan, Tyngsboro, Mass.; Tadmor Shalon, Brentwood, Mo.; Sundar Subramanyam, Stoneham, and Alexander Yurkovetskiy, Acton, both of Mass., assignors to BioPolymerix, Inc., Tyngsboro, Mass.**

**Filed Dec. 20, 1993, Ser. No. 170,510**

**Int. Cl.[6] B01D** *61/00;* **B67D** *5/58;* **A61B** *19/00*

**U.S. Cl. 210—651** **18 Claims**




**1**. A liquid dispenser for dispensing a sterile liquid, comprising:

a container for storing the sterile liquid;

a nozzle assembly mounted on said container, said nozzle assembly having a passageway for enabling flow of the sterile liquid therethrough from said container during liquid dispensing; and

a filter having a downstream and an upstream surface and being attached to said nozzle assembly so that said filter extends across said passageway to direct liquid and air flow through said filter from said container to said downstream surface of said filter;

said filter being at least partially coated on the downstream surface with a first bacteriostatic or bacteriocidal metallic material consisting essentially of silver, silver oxide, a silver salt, or mixtures thereof;

said filter having pores with a pore size so as to preclude passage of microorganisms therethrough and so as to permit passage of the sterile liquid from said container therethrough; and

said filter being at least partially coated within a plurality of said pores with said first metallic material.

**14**. A method of dispensing a sterile liquid comprising applying pressure to the container of the liquid dispenser of claim **1** so as to discharge the sterile liquid through said filter from said container.

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**5,490,939**

## PROCESS FOR RECONCENTRATING OVERSPRAY FROM ONE-COMPONENT COATING COMPOSITIONS

**Markus Gerigk; Jochen Brück, both of Köln, and Wieland Hovestadt, Krefeld, all of, Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany**

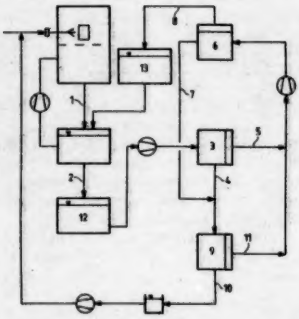
**Filed Feb. 24, 1995, Ser. No. 393,646**

**Claims priority, application Germany, Mar. 3, 1994, 44 06 952.9**

**Int. Cl.[6] B01D** *61/00*

**U.S. Cl. 210—652** **6 Claims**

**1**. A multi-stage membrane filtration process for reconcentrating overspray from a one-component aqueous coating composition containing high molecular weight components having a weight average molecular weight of at least 2000, and at least 5 % by weight of a low molecular weight component having a weight average molecular weight of less than 2000, based on the total



weight of organic components of the coating composition, said overspray having been dilutated with spray booth water from spray booths having wet flushing, to form a booth/water overspray mixture, said process comprising

a) preconcentrating the booth water/overspray mixture in an ultrafiltration unit to obtain a first retentate containing high molecular weight components and a first permeant containing water and at least a portion of the low molecular weight components,

b) treating said first permeant in a reverse osmosis unit to obtain a second permeant containing essentially pure water for recycled as booth water and a second retentate containing low molecular weight components,

c) treating said first and second retentate in a nanofiltration unit to obtain a third permeant containing water and a minor portion of low molecular weight components and a third retentate which largely corresponds in composition and concentration to said one-component aqueous coating composition, and

d) recycling said third permeant to the reverse osmosis unit for treatment in accordance with step b).

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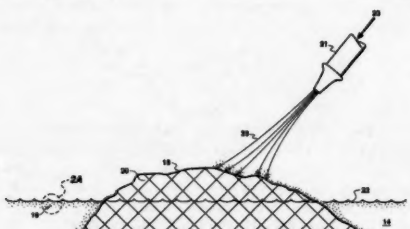
**5,490,940**

## METHOD FOR FORMING MINERAL SOLIDS-OIL FLOCCULES

**James R. Bragg, and Shan H. Yang, both of Houston, Tex., assignors to Exxon Production Research Company, Houston, Tex.**

**Filed Apr. 8, 1994, Ser. No. 225,122**
**Int. Cl.[6] C02F *1/28***
**U.S. Cl. 210—671** **19 Claims**



**10**. A method for dispersing oil on a water surface, said method comprising:

(a) dispersing solid particles consisting essentially of hydrophilic mineral particles having a mean particle diameter of about 10 microns or less in an aqueous liquid, to form a liquid-mineral particle dispersion, said liquid having sufficient ionic strength which will allow formation of substantially buoyant and dispersible stabilized mineral solids-oil flocculates wherein said particles remain substantially hydrophilic;

(b) contacting said oil with said liquid-mineral particle dispersion under conditions allowing discrete oil droplets to form from said oil;

(c) forming said hydrophilic and dispersible stabilized mineral solids-oil flocculates that are substantially buoyant; and

(d) allowing said stabilized mineral solids-oil flocculates to disperse over said water surface.

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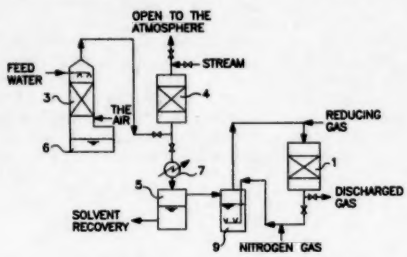
**5,490,941**

## METHOD OF TREATMENT OF A FLUID CONTAINING VOLATILE ORGANIC HALOGENATED COMPOUNDS

**Kanji Miyabe; Nobuhiro Orita; Makoto Iwasaki; Yohka Tsurumaru, and Toshitsugu Nakahara, all of Tokyo, Japan, assignors to Kurita Water Industries, Ltd., Tokyo, Japan**

**Filed Mar. 17, 1993, Ser. No. 32,573**
**Claims priority, application Japan, Mar. 25, 1992, 4-98727; Apr. 23, 1992, 4-129975; Jun. 1, 1992, 4-165346; Jul. 14, 1992, 4-209554; Aug. 7, 1992, 4-232807; Sep. 9, 1992, 4-240492; Sep. 16, 1992, 4-272360; Sep. 25, 1992, 4-280928; Sep. 28, 1992, 4-258020; Jan. 23, 1992, 4-285912; Nov. 12, 1992, 4-327396; Dec. 22, 1992, 4-356940; Feb. 3, 1993, 5-39383**
**Int. Cl.[6] B01D *53/34***
**U.S. Cl. 210—673** **16 Claims**




**9**. A process for decomposing volatile organic halogenated compounds which comprises bringing a gas containing volatile organic halogenated compounds into contact with an adsorbent to adsorb volatile organic halogenated compounds therefrom, regenerating the adsorbent with steam, condensing the resulting steam to obtain a condensed water containing volatile organic halogenated compounds, aerating the condensed water with air to obtain a regeneration gas containing volatile organic halogenated compounds and water, decreasing the relative humidity of the regeneration gas, and then bringing the regeneration gas into contact with a reducing agent in the presence of a palladium catalyst or a platinum catalyst.

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**5,490,942**

## PROCESS OF INHIBITING OXALATE SCALE FORMATION

**Krzysztof Kuczynski, Rhode St. Genese, Belgium, assignor to Monsanto Company, St. Louis, Mo.**

**Filed Jun. 10, 1994, Ser. No. 257,855**
**Int. Cl.[6] C02F *5/14***
**U.S. Cl. 210—700** **6 Claims**

**1**. A method of inhibiting the precipitation and deposition of calcium oxalate scale in an aqueous system, comprising adding to said system an effective amount of a phosphonate compound represented by the general formula:

$$Z_2N-(CH_2)_n-N\underset{Z}{}-(CH_2)_a-N\underset{Z}{}_{\frac{1}{x}}(CH_2)_b-N\underset{Z}{}_{\frac{1}{y}}(CH_2)_m-NZ_2$$

where in Z=—$CHR^1PO_3R_2$;

R=H, $CH_3$, $C_2H_5$ or M;
$R^1$=H, $CH_3$, $CR_3$, $C_6H_5$, or $SO_3H_2$;
M=alkali metal or ammonium ion;
n=2–6,
m=2–6,
a=2–10,
b=2–10,
x=0–6, and
y=1–6,
said aqueous systems having a pH from about 7–13.

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**5,490,943**

## SPINNING PREPARATIONS IN THE FORM OF AQUEOUS EMULSIONS OR AQUEOUS SOLUTIONS CONTAINING POLYMERS

**Ulrich Eicken; Raymond Mathis, both of Duesseldorf; Heidi Fiedler, Korschenbroich, and Manfred Gorzinski, Duesseldorf, all of, Germany, assignors to Henkel Kommanditgesellschaft auf Aktien, Duesseldorf, Germany**

**Division of Ser. No. 867,704, Jul. 8, 1992. This application Sep. 21, 1994, Ser. No. 310,017**

**Claims priority, application Germany, Jan. 8, 1990, 40 00 304.3**

**Int. Cl.[6] C11D** *3/37;15/00*

**U.S. Cl. 252—8.6** **7 Claims**

1. An aqueous spinning finish comprising a solution or emulsion containing from 3% to 40% by weight of a composition containing:

(a) 35% to 95% by weight of at least one smoothing agent selected from the group consisting of mineral oil, esters of $C_{8-22}$ carboxylic acids with $C_{1-22}$ alkyl alcohols, silicones, polyoxyalkylene glycol having an average molecular weight of 600 to 6,000;

(b) 0–55% by weight of at least one member selected from the group consisting of emulsifiers, antistatic agents and wetting agents;

(c) 0–10% by weight of at least one additive selected from the group consisting of pH regulators, filament compacting agents, bactericides and corrosion inhibitors; and from 0.0001% to 0.3% by weight of the solution or emulsion of at least one water-soluble polymer compound having a weight average molecular weight of more than $10^6$ selected from the group consisting of polyalkylene oxides, polyacrylamides, polymethacrylamides and copolymers of acrylamide or methacrylamide with unsaturated carboxylic acid containing 3 to 5 carbon atoms.

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**5,490,944**

## LIQUID FABRIC SOFTENER COMPOSITIONS

**Lamberta B. Suazon, Ajax, Canada, assignor to Colgate-Palmolive Company, New York, N.Y.**

**Filed Aug. 11, 1994, Ser. No. 289,050**

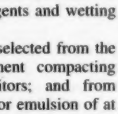
**Int. Cl.[6] D06M** *13/46*

**U.S. Cl. 252—8.8** **16 Claims**

1. A clear, water-soluble fabric softening composition consisting essentially of:

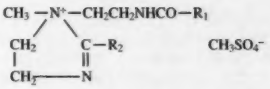
(A) about 3 to about 90% by weight of a blend of:

(1) a quaternary ammonium salt having the structure:



wherein R is the radical residuum of a mixture of saturated and unsaturated fatty acids having about 12 to about 18 carbon atoms, R' is an alkyl radical having about 2 to about 12 carbon atoms, and X is a halide radical or $—SO_3CH_3$; with

(2) an amido imidazolinium compound of the structure:



wherein $R_1$ and $R_2$ are each mixtures of the radical residua of saturated and unsaturated fatty acids having about 12 to about 18 carbon atoms, wherein the ratio of component (1) to component (2) is from abut 8:1 to about 3.6:1; and

(B) water.

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**5,490,945**

## LUBRICATING COMPOSITIONS AND CONCENTRATES

**Thomas R. Smith, Seven Hills; Mary F. Salomon, Mayfield Village; Kirk E. Davis, Chester Township; Jack L. Karn, Richmond Height, and John M. Cahoon, Mentor, all of Ohio, assignors to The Lubrizol Corporation, Wickliffe, Ohio**

**Continuation-in-part of Ser. No. 884,102, May 15, 1992, abandoned, which is a continuation-in-part of Ser. No. 688,195, Apr. 19, 1991, abandoned, and Ser. No. 690,179, Apr. 19, 1991, abandoned. This application Apr. 28, 1994, Ser. No. 234,208**

**Int. Cl.[6] C10M** *125/00;133/56*

**U.S. Cl. 252—18** **74 Claims**

1. A lubricating oil composition comprising a major amount of an oil of lubricating viscosity and

(A) at least about 1% by weight of at least one carboxylic derivative composition produced by reacting

(A-1) at least one substituted succinic acylating agent containing at least about 50 carbon atoms in the substituent with

(A-2) from about 0.5 equivalent up to about 2 moles, per equivalent of acylating agent (A-1), of at least one amine compound characterized by the presence within its structure of at least one HN< group;

(B) an amount of at least one alkali metal overbased salt of a hydrocarbyl substituted carboxylic acid containing at least about 50 carbon atoms in the hydrocarbyl substituent or a mixture of a carboxylic acid and an organic sulfonic acid sufficient to provide at least about 0.002 up to about 0.01 equivalent of alkali metal per 100 grams of the lubricating oil composition provided that when the alkali metal salt comprises a mixture of overbased alkali metal salts of a hydrocarbyl-substituted carboxylic acid and a hydrocarbyl-substituted sulfonic acid, then the carboxylic acid comprises more than 50% of the acid equivalents of the mixture; and either

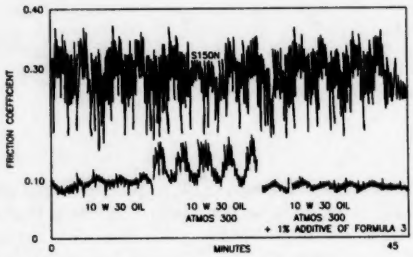
(C-1) at least one magnesium overbased salt of an acidic organic compound having a metal ratio of at least 3 provided that the lubricating composition is free of calcium overbased salts of acidic organic compounds having a metal ratio of at least 3; or

(C-2) at least one calcium overbased salt of an acidic organic compound having a metal ratio of at least 3 provided that the lubricating composition is free of magnesium overbased salts of acidic organic compounds having a metal ratio of at least 3.

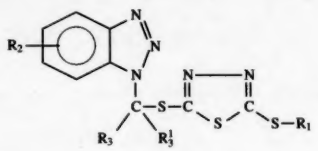
## 5,490,946
## ASHLESS BENZOTRIAZOLE-THIADIAZOL COMPOUNDS AS ANTI-OXIDANT, ANTI-WEAR AND FRICTION MODIFIERS IN LUBRICANTS AND THE LUBRICANTS CONTAINING SUCH COMPOUNDS

**Morton Beltzer, Westfield; Manuel A. Francisco, Washington, and John W. Frankenfeld, Hoboken, all of N.J., assignors to Exxon Research and Engineering Company, Florham Park, N.J.**

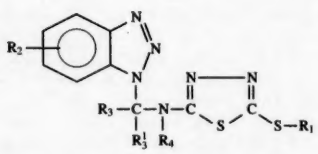
**Filed Oct. 25, 1994, Ser. No. 328,206**
**Int. Cl.[6] C10M** *133/44*
**U.S. Cl. 252—47** **20 Claims**




1. A lubricant composition comprising a major amount of a laboratory base oil and a minor amount of an additive selected from



and



and mixtures thereof wherein $R_1$, $R_2$, $R_3$, $R_3^1$ and $R_4$ may be the same or different and are hydrogen or an alkyl group.

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## 5,490,947
## METHOD FOR CLEANING FIREARMS AND OTHER METAL ORDNANCE

**Anthony Cioffe, 5010 Fillmore St., Hollywood, Fla. 33021**

**Continuation of Ser. No. 118,670, Sep. 10, 1993, abandoned. This application Jan. 6, 1995, Ser. No. 369,320**
**Int. Cl.[6] C11D** *3/39;3/43;17/08;* **C23G** *1/08*
**U.S. Cl. 252—100** **6 Claims**

1. A method for removing gunpowder residues from metal surfaces comprising applying to the residues an effective amount of a cleaning solution comprising:

93 to 99.5% by weight of an aqueous solution of from about 1 to 5% by weight of a peroxide oxidizing agent,

0.5 to 3% by weight of a liquid detergent surfactant,

0 to 1% by weight of a scenting agent, and

0.5 to 3% by weight of an alcohol.

## 5,490,948
## TRANSLUCENT SOLID PRESPOTTING COMPOSITION

**John Klier, Midland; Gary M. Strandburg, Mount Pleasant, and Christopher J. Tucker, Bay City, all of Mich., assignors to Dowbrands Inc., Indianapolis, Ind.**

**Continuation of Ser. No. 42,294, Apr. 2, 1993, abandoned. This application Nov. 18, 1994, Ser. No. 341,853**
**Int. Cl.[6] C11D** *1/04;17/00*
**U.S. Cl. 252—122** **15 Claims**

1. A translucent solid prespotting composition obtained by first forming a single phase microemulsion which is a liquid at the processing temperature between about 50° C. and about 80° C., said liquid microemulsion comprising:

a) a gellant in an amount sufficient to provide the solid composition a hardness of from about 60 to about 120 tenths of a millimeter (ASTM D-127);

b) water in an amount greater than about 15 percent by weight and less than about 60 percent by weight based on the total weight of the composition;

c) an organic solvent or a mixture of two or more organic solvents in an amount greater than about 9 percent by weight and less than about 60 percent by weight based on the total weight of the microemulsion; and

d) one or more surfactants in an amount greater than about 0 percent and less than about 50 percent by weight based on the total weight of the composition; the total amount of a) and d) being greater than about 20 percent by weight and less than about 75 percent by weight;

wherein the solvent or mixture of solvents in said composition consists only of a water immiscible organic solvent or solvents or a mixture of organic solvents containing no more than about 2 weight percent water at 25° C. when the organic solvent or mixture of organic solvents is saturated with water in absence of surfactants and other additives and cooling, the liquid microemulsion to below 50° C. to form the translucent solid composition.

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## 5,490,949
## BLOCK DETERGENT CONTAINING NITRILOTRIACETIC ACID

**Thomas W. Backes, Chesterfiled; Sean D. Dingman, St. Louis, and Sheldon P. Verrett, Olivette, all of Mo., assignors to Monsanto Company, St. Louis, Mo.**

**Continuation-in-part of Ser. No. 278,771, Jul. 22, 1994, Pat. No. 5,419,850. This application Mar. 7, 1995, Ser. No. 399,804**
**Int. Cl.[6] C11D** *17/02;3/33*
**U.S. Cl. 252—174** **13 Claims**

1. A process for producing a phosphate-free solid, block detergent comprising the steps of:

a. preparing an aqueous alkaline solution containing from about 5% to about 40% by weight of the formulation of a first alkali metal containing compound selected from the group consisting of alkali metal hydroxides, alkali metal silicates and mixtures of alkali metal hydroxides and silicates, wherein, when the aqueous alkaline solution contains alkali metal hydroxides, the alkali metal hydroxides must include sufficient potassium hydroxide to constitute from about 0.1% to about 30% by weight of the formulation;

b. mixing from about 5% to about 60% by weight of the formulation of an alkali metal salt of nitrilotriacetic acid into the aqueous alkaline solution to form a slurry;

c. adding from about 0.1% to about 10% by weight of the formulation of an acid selected from the group consisting of propionic acid, nitrilotriacetic acid, ethylene diamine tetraacetic acid, diethylene triamine pentaacetic acid, hydroxy ethylene diamine tetra-acetic acid, amino acids, polyamino acids, amino tri(methylene phosphonic acid), 1-hydroxyethylidene-1,1-diphosphonic acid, diethylene triamine penta(methylene phosphonic acid), oxalic acid, succinic acid, adipic acid, citric acid, maleic acid, malic acid, fumaric acid, tartaric acid, gluconic acid, benzoic acid, ascorbic acid, sorbic acid, linear alkylbenzene sulfonic acid, polyacrylic acid and boric acid to the slurry;

d. mixing from about 5% to about 25% by weight of the formulation of a second alkali metal containing compound selected from the group consisting of alkali metal sulfates, alkali metal carbonates and mixtures of alkali metal sulfates and alkali metal carbonates into the slurry; and

e. curing the slurry.

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5,490,950

## LIQUID CONCENTRATED AQUEOUS SOLUTIONS OF SALTS OF ALKYL ETHER CARBOXYLIC ACID, AND A PROCESS FOR PREPARING SUCH SOLUTIONS

**Jacob K. Smid, Doetinchem, and Jacobus G. Verschuur, Gendringen, both of, Netherlands, assignors to Chem- Y GmbH, Emmerich, Germany**

**Filed Jul. 23, 1993, Ser. No. 97,166**

**Claims priority, application Netherlands, Jul. 24, 1992, 9201339**

**Int. Cl.[6] C11D** *1/72*

**U.S. Cl. 252—174.21** **11 Claims**

1. Liquid concentrated aqueous solutions of salts of alkyl ether carboxylic acid derived from alkanols having at least 10 C atoms, characterized in that the aqueous solution of the salts of alkyl ether carboxylic acid also contains ethoxylated or ethoxylated and carboxymethylated products or mixtures thereof, derived from polyhydric alcohols, the degree of ethoxylation of said products being at least 0.5.

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5,490,951

## HIGHLY REACTIVE FORM OF COPPER AND REAGENTS THEREOF

**Reuben D. Rieke, Lincoln, Nebr., assignor to University of Nebraska, Nebr.**

**Continuation of Ser. No. 692,236, Apr. 26, 1991, abandoned. This application Mar. 23, 1993, Ser. No. 43,143**

**Int. Cl.[6] C09K** *3/00;* **B01J** *23/72*

**U.S. Cl. 252—182.33** **10 Claims**

1. A zerovalent copper species consisting essentially of a combination of zerovalent copper atoms and an alkali metal salt of halide and an alkali metal salt of a cyanide; wherein the copper species is capable of reacting with an allylic halide or acetate to form an allylic organocuprate.

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5,490,952

## HIGHLY REACTIVE FORM OF COPPER AND REAGENTS THEREOF

**Reuben D. Rieke, Lincoln, Nebr., assignor to University of Nebraska, Nebr.**

**Continuation-in-part of Ser. No. 692,236, Apr. 26, 1991, abandoned. This application Apr. 23, 1992, Ser. No. 872,600**

**Int. Cl.[6] C09K** *3/00*

**U.S. Cl. 252—182.33** **11 Claims**

1. A zerovalent copper species consisting essentially of a combination of zerovalent copper metal atoms, an alkali metal salt of cyanide, an alkali metal salt of a halide and an alkali metal salt of an aromatic anion.

5,490,953

## SEMICONDUCTOR COMPOUND

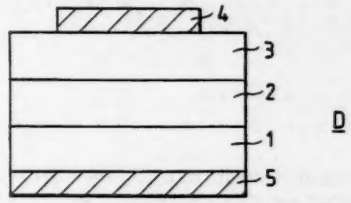
**Yoshio Morita, Osaka, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Osaka, Japan**

**Division of Ser. No. 160,757, Dec. 3, 1993, Pat. No. 5,427,716, which is a division of Ser. No. 894,374, Jun. 4, 1992, abandoned. This application May 17, 1995, Ser. No. 442,930**

**Claims priority, application Japan, Jun. 5, 1991, 3-133982**

**Int. Cl.[6] H01B** *1/00;1/02*

**U.S. Cl. 252—518** **1 Claim**




1. A compound semiconductor of the general formula, $X_5YZ_4$ wherein X is Cu, Y is Al, and Z is S.

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5,490,954

## DETERGENT COMPOSITION OR COMPONENT CONTAINING ANIONIC SURFACTANT AND PROCESS FOR ITS PREPARATION

**Frans A. van der Hoeven, and Christophe Joyeux, both of Rotterdam, Netherlands, assignors to Lever Brothers Company, Division of Conopco, Inc., New York, N.Y.**

**Filed Jun. 24, 1994, Ser. No. 265,285**

**Claims priority, application United Kingdom, Jul. 5, 1993, 9313878**

**Int. Cl.[6] C11D** *17/06;1/12;3/10*

**U.S. Cl. 252—550** **6 Claims**

1. A free-flowing granular detergent component having a bulk density of at least 550 g/liter consisting essentially of:

(a) from 40 to 50 wt % of primary alcohol sulphate,

(b) from 30 to 50 wt % (anhydrous basis) of zeolite,

(c) from 2 to 12 wt % of sodium carbonate,

wherein the detergent component has a moisture content corresponding to relative humidity of air at 1 atm and 20° C. in equilibrium With the composition not exceeding 30 wt. %.

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5,490,955

## CLEANSING COMPOSITIONS BASED ON $C_{10}$14 $C_{16}$ ACYL LACTYLATE

**Desmond B. Hagan, and Peter Carter, both of South Wirral, England, assignors to Elizabeth Arden Company, Division of Conopco, Inc., New York, N.Y.**

**Continuation of Ser. No. 23,186, Feb. 25, 1993, abandoned. This application Mar. 24, 1995, Ser. No. 410,651**

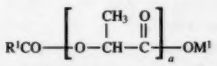
**Claims priority, application United Kingdom, Feb. 27, 1992, 9204175**

**Int. Cl.[6] C11D** *1/37;1/04;1/28;* **A61K** *7/06*

**U.S. Cl. 252—554** **8 Claims**

1. A cleansing composition which comprises, in addition to water,

(a) from 15 to 35% by weight of one or more acyl lactylate(s) of the following structure (1)




(1)

where $R^1CO$ represents a $C_6$ to $C_{16}$ acyl radical; a is an integer from 1 to 3; $M^1$ represents hydrogen or a counterion chosen from

alkali metal, ammonium or a substituted ammonium group having one or more $C_1$ to $C_3$ alkyl or hydroxy alkyl group (s ); and

(b) from 5 to 25% by weight of one or more acylisethionates of the following structure (3)

$$R^3CO—OCH_2CH_2—SO_3M^3 \quad (3)$$

where $R^3CO$ represents a $C_{10}$ to $C_{18}$ acyl group; and $M^3$ is as $M^1$ in structure (1); the composition having a foam height of more than 150 mm, as measured by the Foam Height Test, ASTM D 1173-53.

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**5,490,956**

## THERMOCHROMIC OPAQUE COMPOSITION, LAMINATE MEMBER EMPLOYING THE SAME, AND THREE-DIMENSIONAL MEMBER EMPLOYING SAID LAMINATE MEMBER AND CAPABLE OF CONCEALING AND REVEALING THE INTERIOR

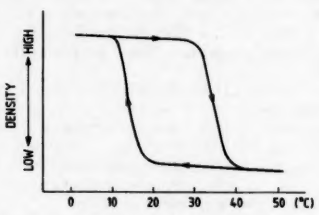
**Tsutomu Kito, Tajimi; Kuniyuki Senga, Kasugai, and Hiroyuki Hayashi, Gifu, all of, Japan, assignors to Pilot Ink Co., Ltd., Nagoya, Japan**

**Filed Oct. 21, 1993, Ser. No. 139,024**

**Claims priority, application Japan, Jan. 26, 1992, 4-311254**

**Int. Cl.[6] G02F *1/00*; C08K *5/00***

**U.S. Cl. 252—583** **11 Claims**




1. A thermochromic opaque composition comprising a dispersion in a vinyl chloride-vinyl acetate copolymer matrix resin of a reversible thermochromic material which is a homogeneous fused composition comprising, with respect to 6 parts by weight of the vinyl chloride-vinyl acetate copolymer resin, (a) 0.05 to 2.0 parts by weight of an electron-donating color-developing organic compound, (b) 0.1 to 3.0 parts by weight a compound having a phenolic hydroxyl radical and (c) 0.5 to 5.0 parts by weight of a compound selected from the group consisting of alcohols, esters, ketones and carboxylic acids, wherein said vinyl chloride-vinyl acetate copolymer resin has an average molecular weight within a range from 7,000 to 50.000 and has constituent monomer ratios of vinyl chloride: vinyl acetate within a range of 60 to 92: 8 to 40%, and wherein aid reversible thermochromic material is dispersed in particles of a size within a range of 0.1 to 2.0 μm, and

said thermochromic opaque composition being capable of exhibiting reversible change in transparency together with change in color in response to temperature variation to exhibit a transparent state in a temperature range above a high trigger temperature and a colored opaque state in a temperature range below a low trigger temperature, with a hysteresis having a temperature difference of 10° C. to 50° C., both states being selectively held in a temperature range between said low and high trigger temperatures.

**5,490,957**

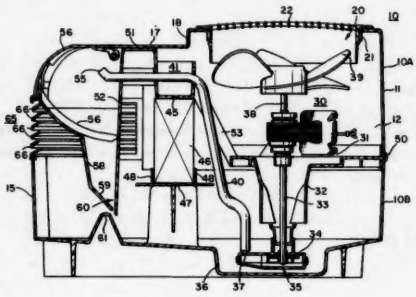
## PORTABLE HUMIDIFIER

**William E. Lasko; Charles Litvin; Kurt F. Hafeken, and Leo Gonzales, all c/o Lasko Metal Products, Inc., P.O. Box 891, W. Chester, Pa. 19380**

**Continuation-in-part of Ser. No. 313,781, Sep. 28, 1994. This application Apr. 5, 1995, Ser. No. 417,109**

**Int. Cl.[6] B01F *3/04***

**U.S. Cl. 261—29** **4 Claims**




1. A portable humidifier for providing moisture laden air which comprises

an outer housing having a front wall, side walls, a top and bottom wall, and a rear wall,

said top wall having an air outlet opening with a grill therein,

said side walls and said rear wall having an air inlet grill opening,

a supply of water in said housing,

motor means carried in said housing with output shafts at the top and bottom of said motor means,

water pump means connected to said bottom output shaft,

said water pump means having a water inlet in communication with said water in said housing and a water outlet,

hose means in communication with said pump water outlet,

a water trough below said top wall extending between said side walls,

a plurality of filter supply drip holes in said trough,

said hose means extending across said trough, and having a water supply nozzle to supply water thereto,

at least one vertically oriented filter means below said openings in said water trough to receive water therefrom, and which is above the water on said bottom housing wall,

said hose having a water show nozzle on the end thereof,

viewing means in said rear wall to permit viewing of water discharged from said water show nozzle, and

fan blade means connected to said motor top output shaft to cause air to flow in through said air inlet grill opening, through said water filter means, and to cause moisture laden air to flow out through said air outlet opening grill.

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**5,490,958**

## FILLER FOR HEAT EXCHANGER

**In C. Lim, 663-21, Yeoksam-dong, Kangnam-ku, Seoul 135-030, Rep. of Korea**

**Filed Jan. 18, 1995, Ser. No. 375,154**

**Claims priority, application Rep. of Korea, Jan. 18, 1994, 888/1994**

**Int. Cl.[6] B01F *3/04***

**U.S. Cl. 261—112.1** **6 Claims**

1. A filler for cooling tower comprising a substantially rectangular frame which includes several horizontally extending rods and two vertically extending rods each of which connects the ends of said horizontally extending rods respectively at both ends thereof, and a series of consecutive protrusion plates which are formed by two substantially triangular plates between each adjacent horizontal rods, wherein the upper side and lower side of said protrusion

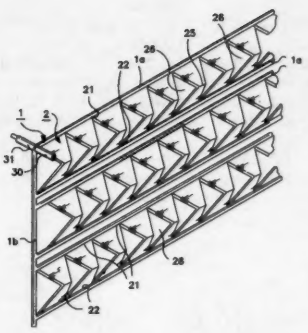


plate are secured on the adjacent horizontal rods respectively and the middle portions of said protrusion plates protrude forward in a certain height.

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**5,490,959**

**METHOD OF FORMING SHAPED HYDROGEL ARTICLES INCLUDING CONTACT LENSES USING INERT, DISPLACEABLE DILUENTS**

**Ivan M. Nuñez, Jacksonville; Frank F. Molock, Orange Park; Laura D. Elliott, Jacksonville, and James D. Ford, Orange Park, all of Fla., assignors to Johnson & Johnson Vision Products, Inc., Jacksonville, Fla.**

**Division of Ser. No. 96,145, Jul. 22, 1993, Pat. No. 5,457,140. This application May 31, 1995, Ser. No. 455,948**

**Int. Cl.[6] B29D** *11/00;* **C08L** *33/14*

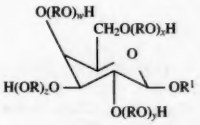
**U.S. Cl. 264—2.6** **2 Claims**

1. A process for producing shaped hydrogel articles which comprises the steps of:

(1) molding or casting a polymerization mixture comprising:

(a) a monomer mixture comprising a major proportion of one or more hydrophilic monomers, and one or more crosslinking monomers; and

(b) an inert, displaceable, non-aqueous diluent comprising a single phase mixture of ethoxylated or propoxylated alkyl glucoside of Formula (I):




wherein $R^1$ represents a $C_{1-6}$alkyl group, each R individually represents —$CH_2$—$CH_2$— or —$CH_2$—$CH(CH_3)$—, and the sum of w, x, y, and z is a number within the range of from about 5 to 50, provided that a major proportion of the R groups in the mixture of compositions represented by Formula (I) represent —$CH_2$—$CH_2$— groups;

and a dihydric alcohol of up to 12 carbon atoms;

under conditions to polymerize said monomer mixture to produce a shaped gel of a copolymer of said monomers and said diluent; and

(2) thereafter replacing said diluent with water,

provided that said inert, displaceable, non-aqueous diluent is selected such that when said polymerization mixture is polymerized in a photo differential scanning calorimeter wherein said polymerization is induced by ultraviolet irradiation at a light intensity of from about 2.5 to 3 mW/cm$^2$, the time to maximum exotherm of said polymerization is within the range of from about 0.2 to about 3.5 minutes and the percent conversion to polymer of the monomer mixture at maximum exotherm is at least 40 percent.

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**5,490,960**

**METHOD OF FORMING SHAPED HYDROGEL ARTICLES INCLUDING CONTACT LENSES USING INERT, DISPLACEABLE DILUENTS**

**Ivan M. Nuñez, Jacksonville; Frank F. Molock, Orange Park; Laura D. Elliott, Jacksonville, and James D. Ford, Orange Park, all of Fla., assignors to Johnson & Johnson Vision Products, Inc., Jacksonville, Fla.**

**Division of Ser. No. 96,145, Jul. 22, 1993, Pat. No. 5,457,140. This application May 31, 1995, Ser. No. 456,133**

**Int. Cl.[6] B29D** *11/00;* **C08L** *33/14*

**U.S. Cl. 264—2.6** **1 Claim**

1. A process for producing shaped hydrogel articles which comprises the steps of:

(1) molding or casting a polymerization mixture comprising:

(a) a monomer mixture comprising a major proportion of one or more hydrophilic monomers, and one or more crosslinking monomers; and

(b) an inert, displaceable, non-aqueous diluent comprising an ethoxylated $C_{3-6}$ alkanetriol;

under conditions to polymerize said monomer mixture to produce a shaped gel of a copolymer of said monomers and said diluent; and

(2) thereafter replacing said diluent with water, provided that said inert, displaceable, non-aqueous diluent is selected such that when said polymerization mixture is polymerized in a photo differential scanning calorimeter wherein said polymerization is induced by ultraviolet irradiation at a light intensity of from about 2.5 to 3 mW/cm$^2$, the time to maximum exotherm of said polymerization is within the range of from about 0.2 to about 3.5 minutes and the percent conversion to polymer of the monomer mixture at maximum exotherm is at least 40 percent.

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**5,490,961**

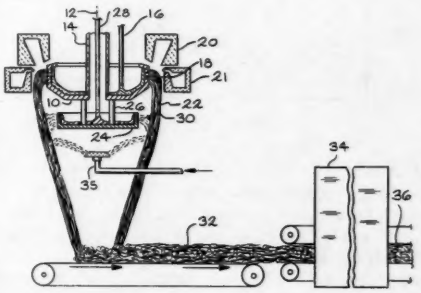
**METHOD FOR MANUFACTURING A MINERAL FIBER PRODUCT**

**Shiv K. Bakhshi, Columbus; Steven H. Williams, Alexandria; James W. Scott, Newark; Randall M. Haines, Frazeysburg, and Ralph D. McGrath, Granville, all of Ohio, assignors to Owens-Corning Fiberglas Technology, Inc., Summit, Ill.**

**Filed Jun. 21, 1993, Ser. No. 79,413**

**Int. Cl.[6] C03B** *37/04*

**U.S. Cl. 264—6** **17 Claims**




1. The method for manufacturing a mineral fiber product comprising

a. forming mineral fibers from molten mineral material,

b. establishing a stream of the mineral fibers,

c. directing fibers of polymeric material toward the stream of mineral fibers to cause intermingling of the polymeric material and the mineral fibers,

d. applying heat to the polymeric fibers so that some of them become softened to the extent that they lose their fibrous form and become attached to the mineral fibers as polymeric, non-fibrous particles, whereas some of the polymeric fibers retain their fibrous form; and,

e. collecting the intermingled mineral fibers having polymeric, non-fibrous particles attached thereto and polymeric fibers to form a mineral fiber product.

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**5,490,962**

## PREPARATION OF MEDICAL DEVICES BY SOLID FREE-FORM FABRICATION METHODS

**Linda G. Cima, and Michael J. Cima, both of Lexington, Mass., assignors to Massachusetts Institute of Technology, Cambridge, Mass.**

**Filed Oct. 18, 1993, Ser. No. 138,345**
**Int. Cl.[6] B29C** *35/08;41/02;67/00;67/20*
**U.S. Cl. 264—22** **19 Claims**

1. A method for making medical devices comprising forming an implantable medical device using a solid free-form fabrication method to form a matrix of sequential layers of biocompatible material, wherein the matrix has a defined microstructure on a scale of ten microns.

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**5,490,963**

## PREPARATION OF THIN FREE-STANDING DIAMOND FILMS

**James F. Fleischer, and Steven M. Gasworth, both of Scotia, N.Y., assignors to General Electric Company, Worthington, Ohio**

**Division of Ser. No. 73,239, Jun. 7, 1993, abandoned. This application Jan. 5, 1995, Ser. No. 369,047**
**Int. Cl.[6] H01L** *21/302*
**U.S. Cl. 264—400** **4 Claims**

1. A process for shaping a thin, free-standing diamond film having a rough growth surface comprising the steps of:

(a) cutting the rough growth surface of said film with a series of first cuts of a laser at an angle +θ, said angle +θ being measured from the perpendicular to said surface;

(b) rotating said film 180° and cutting said growth surface with a series of second cuts at an angle −φ, said angle −φ being measured from the perpendicular to said surface whereby said second cuts intersect said first cuts to form a plurality of first ridges, said first ridges having a height;

(c) translating said film in a direction parallel to said surface or rotating said film along an axis of rotation perpendicular to said surface and repeating steps (a) and (b) to remove additional diamond with additional cuts such that a plurality of second ridges are formed, said second ridges having a height less than the height of said first ridges; and

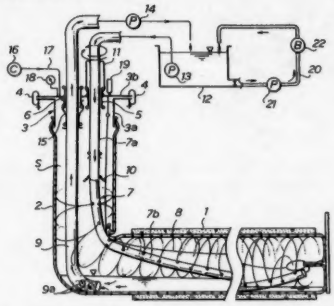
(d) lapping said growth surface to reduce the height of said second ridges.

**5,490,964**

## METHOD AND DEVICE FOR REPAIRING A TUBULAR CONDUIT

**Takao Kamiyama, Hiratsuka; Yasuhiro Yokoshima, Ibaraki, and Shigeru Endoh, Kasukabe, all of, Japan, assignors to Yokoshima & Company; GET, Inc., both of Ibaraki, and Shonan Gosei-Jushi Seisakusho K.K., Kanagawa, all of, Japan**

**Filed Mar. 15, 1994, Ser. No. 212,778**
**Claims priority, application Japan, Apr. 13, 1993, 5-086456**
**Int. Cl.[6] B29C** *63/36*
**U.S. Cl. 264—36** **6 Claims**



1. A method for repairing a tubular conduit by lining the inner wall of the tubular conduit with a tubular liner bag impregnated with thermosetting liquid resin, comprising the steps of: (a) everting the tubular liner bag in the tubular conduit; (b) inserting a heat-resistive hose into said [closed space through said tubular liner bag; (c) closing the open end of the tubular liner bag with a stationary lid means thereby forming a closed space inside the tubular liner bag and the lid means, said heat-resistive hose being slidably supported through said lid means, and connected to said lid means via a flexible inflatable sealing device such that when a pressurized fluid is charged into said closed space said sealing device is pressed to inflate externally from said lid means forcing said heat-resistive hose to slide externally, wherein said flexible inflatable sealing device comprises a tube having one end connected to the outer surface of said heat-resistive hose and another end everted and anchored to said lid means; (d) inflatting said tubular liner bag by charging said pressurized fluid into the closed space; and (e) supplying hot, water via said heat-resistive hose to thereby heat and harden said liner bag.

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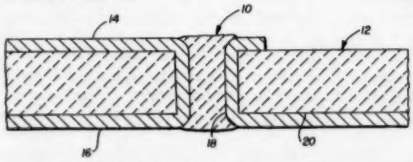
**5,490,965**

## METHOD FOR CLOSING HOLES IN CERAMIC SUBSTRATES

**Frank J. Christiansen, Colorado Springs, Colo., assignor to Hewlett-Packard Company, Palo Alto, Calif.**

**Division of Ser. No. 185,620, Jan. 24, 1994. This application Sep. 29, 1994, Ser. No. 315,057**
**Int. Cl.[6] B29C** *71/00*
**U.S. Cl. 264—237** **6 Claims**



1. A method for closing holes in a ceramic substrate comprising the steps of:

providing a ceramic substrate comprising at least one hole therethrough, said substrate melting at a first temperature;

filling said hole in said substrate with a paste consisting essentially of a ceramic sealing material which melts at a second

temperature that is less than said first temperature at which said ceramic substrate melts, a ceramic stabilizing material which melts at a third temperature that is greater than said second temperature at which said ceramic sealing material melts, and an organic carrier for suspending said ceramic sealing material and said ceramic stabilizing material together in order to form said paste;

heating said ceramic substrate and said paste to a burn-off temperature sufficient to burn off the organic carrier within said paste, said burn-off temperature being less than said second temperature at which said ceramic sealing material melts;

maintaining the ceramic substrate and said paste at said burn-off temperature for a burn-off time period sufficient to burn off substantially all of the organic carrier from said paste;

additionally heating said ceramic substrate and said paste to said second temperature in the range of about 490° C. to 530° C. in order to melt the ceramic sealing material and thereby form molten ceramic sealing material;

maintaining the ceramic substrate at said second temperature for a sealing time period sufficient to allow the molten ceramic sealing material to fill interstices in the hole; and

cooling the ceramic substrate in order to cause said molten ceramic sealing material to solidify within said hole.

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**5,490,966**

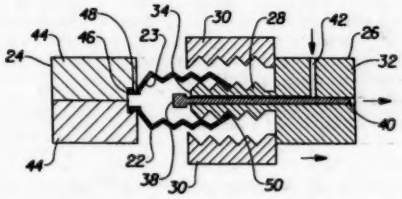
## METHOD FOR STRIPPING OPEN ENDED BELLOWS PART FROM INJECTION MOLD

**Robert J. Peterson, Loveland; Michael D. Webb, West Chester, both of Ohio, and Reuben E. Oder, Union, Ky., assignors to The Procter & Gamble Company, Cincinnati, Ohio**

**Filed Nov. 2, 1994, Ser. No. 333,449**

**Int. Cl.[6] B29C** *45/43;45/44*

**U.S. Cl. 264—318** **8 Claims**




1. A method for stripping a bellows part from an injection mold comprising the steps of;

a) injection molding a bellows part having two open ends around a core pin, said core pin having a longitudinal axis and a first split cavity surrounding said core pin, said bellows part having an undercut portion;

b) opening said first split cavity to permit said bellows part to be stripped from said core pin;

c) expanding said bellows part outward from said core pin;

d) gripping said bellows part at said undercut portion by a gripping means; and

e) pulling said bellows part at said undercut portion by said gripping means to remove said bellows part from said core pin while said bellows part is expanded outwardly from said core pin, said gripping means comprising a solid cavity which grips said undercut portion of said bellows part, said solid cavity separating axially from said core pin to pull said bellows part from said core pin while said bellows part is expanded outwardly from said core pin.

**5,490,967**

## LOW HEAT RELEASE POLYMERIC COMPOSITES

**Patrick H. Martin, Danville, Calif.; Stephen E. Bales, Midland, Mich.; Peter K. Kim, Danville, Calif., and Ritchie A. Wessling, Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.**

**Division of Ser. No. 245,152, May 17, 1994, Pat. No. 5,419,957. This application Jan. 11, 1995, Ser. No. 371,332**

**Int. Cl.[6] B32B** *5/24*

**U.S. Cl. 264—322** **18 Claims**

1. A process for preparing a low heat release, low density, fiber-reinforced composite comprising a thermoplastic polymer matrix, having a void volume of from about 20 to about 90 percent, comprising: (a) heating a densified fiber-reinforced polymer sheet comprising the thermoplastic polymer matrix with a thermoplastic skin layer laminated on each major surface thereof, to a temperature above the softening temperature of the thermoplastic polymer matrix, whereby the sheet is expanded in a direction perpendicular to that of a plane defined by the sheet, and (b) cooling the expanded sheet below the softening temperature thereof to form a low heat release, low density, fiber-reinforced composite having a thermoplastic skin layer laminated on each major surface thereof, wherein (i) said thermoplastic polymer matrix is selected from the group consisting of polyarylsulfone, polyethersulfone, polyetheretherketone, polyetherketoneketone, a copolycarbonate of 4,4'-thiodiphenol and at least one member of the group consisting of bisphenol A, 9,9-bis(4-hydroxyphenyl) fluorene, and 1,1-bis(4-hydroxyphenyl)-1-phenyl ethane, a copolycarbonate of bisphenol A and 9,9-bis(4-hydroxyphenyl) fluorene, 1,1-bis(4-hydroxyphenyl)-1-phenyl ethane polycarbonate, bisphenol A polycarbonate, and polyetherimide; and (ii) distributed throughout said matrix are reinforcing fibers from about 10 to 70 percent by weight of the sheet, wherein said fibers are randomly oriented in two dimensions substantially in the plane defined by said sheet and have an average length less than about 0.5 inches, and an aspect ratio of at least about 40.

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**5,490,968**

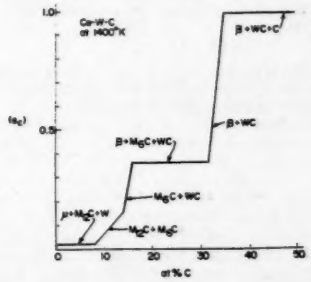
## METAL ARTICLE AND METHOD FOR PRODUCING THE SAME (C-2580)

**Richard S. Polizzotti, Milford; Larry E. McCandlish, Highland Park, both of N.J., and Edwin L. Kugler, Morgantown, W. Va., assignors to Exxon Research and Engineering Company, Florham Park, N.J.**

**Division of Ser. No. 128,182, Sep. 29, 1993, Pat. No. 5,441,553. This application Mar. 17, 1995, Ser. No. 405,631**

**Int. Cl.[6] B22F** *3/12*

**U.S. Cl. 419—2** **12 Claims**



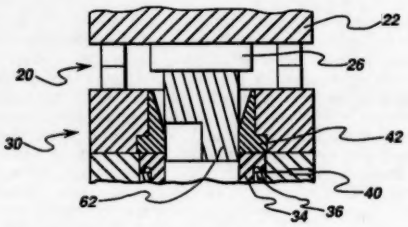

1. A method for producing a compacted multiphase composite article, said method comprising providing a particle charge of a precursor compound containing at least two metals and a coordinating ligand, heating said compound to remove said coordinating ligand therefrom and increase the surface area thereof, thereafter reacting at least one of said metals to form a metal-containing compound and consolidating said particle charge to produce said compacted, multiphase composite article.

5,490,969

## MOULD FOR ISOSTATIC PRESSING

Bernard P. Bewlay, and Dennis J. Dalpe, both of Schenectady, N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Jun. 30, 1994, Ser. No. 269,272
Int. Cl.[6] B22F *3/02;5/00*
U.S. Cl. 419—68 14 Claims




1. A method for forming a metal compact in a cold isostatic press having at least one open end comprising the steps of:

depositing a metal powder in the mould of the cold isostatic press;

sealing at least one end of the mould with a punch having a base section substantially normal to the mould and an insert section, having any one of a plurality of geometric shapes, extending from the base section into the mould;

applying pressure to the outer surface of the mould; and

decompressing the mould by reducing the pressure such that the resulting compact has a taper applied to at least one end thereof thereby eliminating elephant's foot on the tapered end.

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5,490,970

## METHOD OF PRODUCING HYDROGEN-STORING ALLOY AND ELECTRODE MAKING USE OF THE ALLOY

Takaharu Gamo, Fujiidera; Yoshio Moriwaki, Hirakata; Tsutomu Iwaki, Yawata, and Akemi Shintani, Osaka, all of, Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Continuation of Ser. No. 55,760, May 3, 1993, abandoned, which is a continuation of Ser. No. 796,818, Nov. 25, 1991, abandoned, which is a division of Ser. No. 548,891, Aug. 2, 1990. This application Jun. 16, 1994, Ser. No. 261,305
Claims priority, application Japan, Jun. 28, 1988, 63-160056; Aug. 30, 1988, 63-215427; Dec. 29, 1988, 63-333227; Dec. 29, 1988, 63-333228
Int. Cl.[6] C22C *1/02*
U.S. Cl. 420—424 6 Claims

1. A method of producing a hydrogen-storage alloy or its hydrogenated product comprising the steps of:

preparing a starting mixture by mixing i) a ferrovanadium alloy and ii) at least one element selected from the group consisting of: Zr, Ni, Ti, Hf, Ta, Y, Ca, Mg, La, Ce, Nb, Nd, Sm, Mo, Al, Si, V, Cr, Mn, Fe, Co, Cu, Zn, W, Cd and a mixture of rare earth elements so that the mixture has a composition of $Zr_\alpha V_\beta Ni_\gamma M_\delta$ and in which M is either at least Fe or Fe and at least one element selected from the group consisting of Mn, Co and Ce and in which α represents a value of from 0.5 to 1.5; β represents a value of from 0. 0 1 to 1.2, γ represents a value of from 0.4 to 2.5, δ represents a value of from 0.01 to 1.8 and β+γ+δ represents a value of from 1.2 to 3.7;

melting said mixture to obtain a molten alloy having Laves phase of an intermetallic compound with crystalline structure of cubic-symmetrical C15 having crystalline lattice constant of a=6.92 to 7.70; and

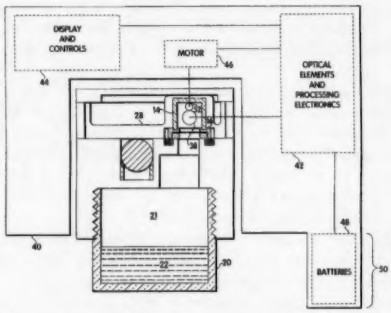
casting the alloy to obtain the hydrogen-storage alloy having a composition of $Zr_\alpha V_\beta Ni_\gamma M_\delta$ wherein α, β, γ, δ and M are as defined above.

5,490,971

## CHEMICAL DETECTOR

Michael M. Gifford, Rochester, and Kevin J. Mackie, Mansfield, both of Mass., assignors to Sippican, Inc., Marion, Mass.

Filed Oct. 25, 1994, Ser. No. 328,461
Int. Cl.[6] G01N *21/01*
U.S. Cl. 422—58 62 Claims




22. Apparatus for chemical detection, comprising:

a cap for coupling with a sample vial containing a sample, the cap defining a passage through which pass vapors from the sample, the vapors including at least one chemical to be detected;

a reagent vial included in the cap, the reagent vial containing a liquid reagent which is reactable with the chemical to form a reaction product having at least one detectable property related to the concentration of the chemical, and the reagent vial including a membrane which retains the liquid reagent and the reaction product above the membrane and within the reagent vial, wherein said membrane is permeable to the chemical to be detected; and

means, coupled to the cap, for moving the reagent vial between a first position and a second position, the reagent vial being disposed from the passage when in the first position such that the vapors are prevented from impinging upon the membrane, the reagent vial being aligned with the passage when in the second position such that the vapors are allowed to diffuse into contact with the membrane.

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5,490,972

## RAISING MECHANISM FOR INCUBATOR COVER

Gary S. Hartman, Spencerport, and James G. Miller, Hilton, both of N.Y., assignors to Johnson & Johnson Clinical Diagnostics, Inc., Rochester, N.Y.

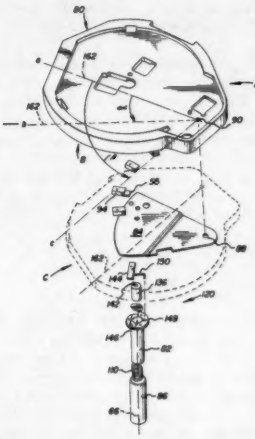
Filed Apr. 29, 1994, Ser. No. 236,909
Int. Cl.[6] G01N *37/00*
U.S. Cl. 422—64 7 Claims

1. In an incubator useful in a clinical analyzer, the incubator comprising a rotor having stations thereon for receiving a plurality of test elements, means for rotating said rotor about an axis, a cover for said incubator, and mounting means permitting movement of said cover from a covering position to an access position moved away from said incubator to allow operator access to said incubator,

the improvement wherein said mounting means comprise a connector on which said cover is mounted, between said cover and said incubator, constructed to permit said cover to be raised from and lowered to said covering position to a raised, superimposed position, but not to be pivoted,

a pivot pin on said connector for pivoting said cover within a horizontal plane from said raised, superimposed position to a raised, incubator-accessible position, and back,

and latch means on said connector for automatically latching said cover in said raised position as soon as said cover is



pivoted in said plane a predetermined angle away from said superimposed position.

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**5,490,973**

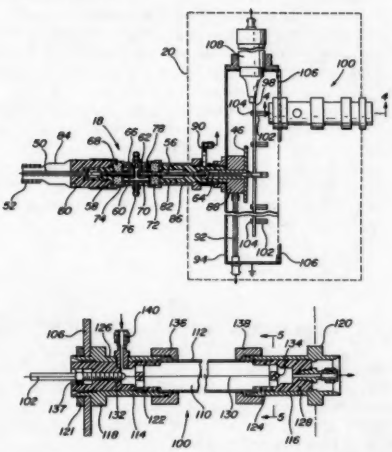
## PULSED CORONA REACTOR SYSTEM FOR ABATEMENT OF POLLUTION BY HAZARDOUS AGENTS

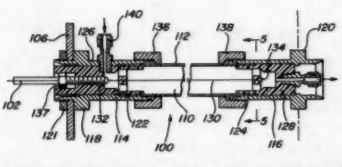
**Michael G. Grothaus; Richard A. Korzekwa, both of Dahlgren, Va., and R. Kenneth Hutcherson, Silver Spring, Md., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed May 23, 1994, Ser. No. 252,287**

**Int. Cl.**[6] **B01D** *53/32;* **B01J** *19/12*

**U.S. Cl. 422—186.04** **12 Claims**





**1**. A system for treating a polluted fluent within a plurality of reactor modules by exposure to streamer corona discharge comprising an electrode wire extending through a reaction zone enclosed within a tubular electrode in each of said reactor modules; power controlled means for supply of electrical energy to the reactor modules, header means connecting the power controlled means in parallel to the electrode wires of the reactor modules for transfer of said electrical energy thereto, mounting means connected to the tubular electrodes for support and grounding thereof in spaced adjacency to the header means and insulator means through which the electrode wires extend into the reaction zones of the reactor modules for electrically insulating the header means and the mounting means from each other.

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**5,490,974**

## TUBULAR HEATER FOR PREPARING CARBON MONOXIDE-CONTAINING GAS MIXTURES

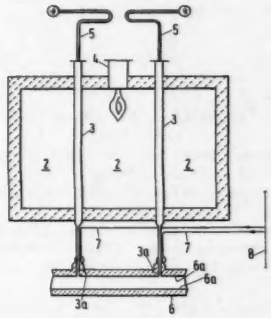
**Friedrich Hohmann, Langen; Werner Röll, Freigericht, and Hans G. Mörtel, Frankfurt, all of, Germany, assignors to Metallgesellschaft Aktiengesellschaft, Frankfurt, Germany**

**Filed Jul. 27, 1994, Ser. No. 281,058**

**Claims priority, application Germany, Aug. 13, 1993, 43 27 176.6**

**Int. Cl.**[6] **B01J** *8/04;* **F23D** *11/38;* **F27D** *23/00*

**U.S. Cl. 422—197** **7 Claims**



**1**. A tubular heater for a catalytic cracking of hydrocarbons in order to prepare a raw synthesis gas which mainly contains hydrogen, carbon monoxide and carbon dioxide, which heater comprises a refractory housing containing a combustion chamber and heating means in said combustion chamber, a plurality of tubes being disposed in said combustion chamber, said tubes containing a catalyst, said catalyst being indirectly heated by said heating means, said tubes having supply means for supplying hydrocarbons and steam into said tubes, said tubes having outlet ends downstream of said catalyst, said outlet ends being disposed outside said combustion chamber through which raw synthesis gas flows, said outlet ends being connected to a collecting line for collecting said raw synthesis gas, the inside surface of said collecting line and the outside surface of said outlet ends being provided with a porous refractory lining, bell-shaped portions of the collecting line being connected to the outside of the least some of said outlet ends, each of said bell-shaped portions being provided with a supply line for supplying a gaseous or vaporous protecting fluid which is substantially free of CO to the outside surface of the outlet end of said portion and into the refractory lining.

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**5,490,975**

## STERILIZATION AND STORAGE CONTAINER TRAY

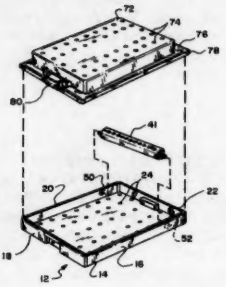
**Gary T. Dane, Webster, N.H., assignor to Poly-Vac Incorporated, Manchester, N.H.**

**Filed Dec. 14, 1994, Ser. No. 355,997**

**Int. Cl.**[6] **A61L** *2/00*

**U.S. Cl. 422—300** **10 Claims**

**1**. In a sterilization tray assembly for sterilizing, transporting and storing surgical instruments comprising top and bottom mating enclosures, said mating enclosures each including a plurality of ports for permitting ingress and egress of gaseous sterilant; and means for locking said mating enclosures to one another, the improvement which comprises a rack rotatably mounted within the bottom enclosure, said rack having a plurality of spaced apertures into which surgical instruments may be removably inserted, said




rotatable rack comprising an aperatured core member and including an apertured resilient, flexible cover member surrounding said core member at least in part.

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**5,490,976**

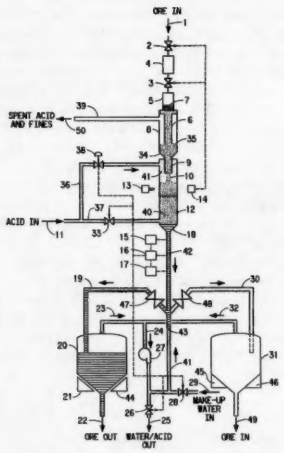
**CONTINUOUS ORE REACTION PROCESS BY FLUIDIZING**

**Foster W. Rennie, Wilmington; Tze Chao, Newark, both of Del.; Donald H. Eastham, Victoria, Tex., and James V. Tarbell, Hockessin, Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Continuation of Ser. No. 890,426, May 29, 1992, abandoned, which is a continuation-in-part of Ser. No. 749,863, Aug. 26, 1991, abandoned. This application Apr. 25, 1994, Ser. No. 232,302**

**Int. Cl.**[6] **C22B** *1/00;3/00;34/00;11/00*

**U.S. Cl. 423—658.5** **17 Claims**




1. In a continuous process for reacting particulate ore with a liquid reagent in a counter-current vertical column, wherein liquid reagent is introduced at the bottom of the column, particulate ore is introduced at the top of the column, reacted particulate ore is removed at the bottom of the column, and spent liquid reagent is removed at the top of the column, the improvement comprising:

(a) providing an upper and lower chamber for the vertical column, each of said chambers having a bottom outlet with a diameter which is less than that of the diameter of the chamber;

(b) flowing a sufficient amount of liquid reagent upward in the upper chamber at a fluidization index of about 5–6 so that the particulate ore is wetted and deaerated, at least some fine particles thereof are carried overhead for removal, and the remainder of the particulate ore settles and enters the lower chamber;

(c) fluidizing the particulate ore with liquid reagent in the lower chamber and retaining the particulate ore in the lower chamber until at least 10 percent of the theoretical amount of reaction of liquid reagent with the particulate ore takes place to form reacted particulate ore and wherein at least some of the fine ore particles which are generated in this step or which are introduced with the particulate ore are entrained and carried upward for removal, and a slurry of the reacted particulate ore and liquid reagent exits the lowr chamber.

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**5,490,977**

**REMOVAL OF CO, HYDROCARBONS AND $NO_X$ WITH CATALYST CONTAINING PLATINUM RHODIUM**

**Chung-Zong Wan, Somerset; Samuel J. Tauster, Englishtown, and Harold N. Rabinowitz, Upper Montclair, all of N.J., assignors to Engelhard Corporation, Iselin, N.J.**

**Division of Ser. No. 775,666, Oct. 11, 1991, Pat. No. 5,254,519, which is a continuation-in-part of Ser. No. 483,485, Feb. 22, 1990, Pat. No. 5,057,483. This application Aug. 10, 1993, Ser. No. 104,838**

**Int. Cl.**[6] **B01J** *23/63*

**U.S. Cl. 423—210** **13 Claims**

1. A method for treating a gas comprising carbon monoxide, hydrocarbons and nitrogen oxides, comprising the step of:

catalytically oxidizing carbon monoxide and hydrocarbons present in the gas, and catalytically reducing nitrogen oxides present in the gas, in the presence of a catalyst composition comprising;

a refractory body having a plurality of substantially parallel passages extending therethrough, the passages being defined by walls, and

a catalytic material disposed on the walls, the catalytic material comprising a catalytic coat, and the catalytic coat comprising,

from 0.45 to 2.0 g/in$^3$ the catalyst composition of a co-formed rare earth oxide-zirconia support material wherein there is 2 to 30 weight percent rare earth oxide based on the weight of rare earth oxide plus zirconia, and having a first rhodium catalytic component dispersed thereon to catalyze the oxidation of carbon monoxide and catalyze the reduction of nitrogen oxides, and

an alumina support material having a platinum catalytic component dispersed thereon to catalyze the oxidation of carbon monoxide and hydrocarbons,

wherein the total rhodium catalytic component is present at from about 0.1 g/ft$^3$ to 15 g/ft$^3$ of catalyst composition and the total platinum catalytic component is present at from 5 to 100 g/ft$^3$ of the catalyst composition.

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**5,490,978**

**BLOCK COPOLYMERS OF POLYSACCHARIDES AND POLYALKYLENE OXIDES**

**Suree M. Spaltro, Hackensack, N.J.; Kavssery Ananthapadmanabhan, New Windsor; Michael P. Aronson, West Nyack, both of N.Y., and Michael Frushour, Little Ferry, N.J., assignors to Chesebrough-Pond's USA Co., Division of Conopco, Inc., Greenwich, Conn.**

**Continuation of Ser. No. 138,167, Oct. 15, 1993, abandoned. This application Nov. 28, 1994, Ser. No. 345,286**

**Int. Cl.**[6] **A61K** *7/16*

**U.S. Cl. 424—49** **17 Claims**

1. A block copolymer comprising at least one unit of a general formula I:

A-B (I)

wherein

A is a polysaccharide block,
B is a polyalkylene oxide block, and
B is covalently bound to A solely at the anomeric carbon of A.

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**5,490,979**

**CLEAR ANTIPERSPIRANT STICK GELLED WITH DIBENZYLIDENE SORBITOL AND CONTAINING A GUANIDINE COMPOUND AS GEL STABILIZER, AND PROCESS OF MAKING SAME**

**Radhakrishna B. Kasat, Bellemead; Wilson Lee, Bloomfield; David R. McCarthy, Basking Ridge, and Norayr G. Telyan, North Caldwell, all of N.J., assignors to The Mennen Company, Morristown, N.J.**

**Filed Jan. 7, 1994, Ser. No. 178,823**
**Int. Cl.[6] A61K** *7/32;7/34;7/36;7/38*
**U.S. Cl. 424—66** **40 Claims**

1. A clear, antiperspirant metal salt-containing, gel stick composition, comprising:

a) an antiperspirant metal salt, in an antiperspirant effective amount;

b) dibenzylidene sorbitol as a gelling agent, in an amount sufficient to form a gel of the composition;

c) a solvent for the dibenzylidene sorbitol, in an amount sufficient to dissolve all of the dibenzylidene sorbitol; and

d) a guanidine compound, wherein said guanidine compound is selected from the group consisting of guanidine carbonate, aminoguanidine bicarbonate, guanidine phosphate, guanidine hydrochloride, guanidine nitrate, guanidine sulfonate, guanidine bisulfate and guanidine hydrobromide, and mixtures thereof, said guanidine compound being in the composition in an amount sufficient to stabilize the gel stick composition.

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**5,490,980**

**COVALENT BONDING OF ACTIVE AGENTS TO SKIN, HAIR OR NAILS**

**Norman K. Richardson, Rockaway, N.J.; Kurt M. Schilling, Parkgate, England; David J. Pocalyko, Lincoln Park, N.J., and Peter L. Bailey, Heswall, Great Britain, assignors to Chesebrough-Pond's USA Co., Division of Conopco, Inc., Greenwich, Conn.**

**Filed Sep. 28, 1994, Ser. No. 314,178**
**Int. Cl.[6] A61K** *38/46;37/00*
**U.S. Cl. 424—94.6** **9 Claims**

1. A composition for topical application to human skin, hair, or nails, the composition comprising:

a) an effective amount of at least one active ingredient which includes at least one —R'$NH_2$ group and is selected from the group consisting of proteins and peptides,

wherein R' is a straight aliphatic hydrocarbon chain containing from 1 to 8 carbon atoms;

b) transglutaminase in an amount effective to catalyze the crosslinking of the active ingredient to glutamine residues in human skin, hair, or nails; and

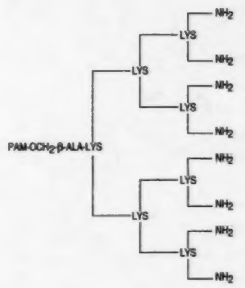
c) a pharmaceutically acceptable carrier in an amount effective to deliver transglutaminase and the skin benefit ingredient to human skin, hair, or nails.

**5,490,981**

**DIAGNOSTIC AND THERAPEUTIC COMPOSITIONS AND METHODS FOR LIPOPROTEIN(A)**

**Steven G. Chiknas, Vienna, Va., assignor to John E. Carbaugh, Jr., Rosslyn, Va.**

**Continuation of Ser. No. 86,358, Jul. 6, 1993, abandoned, which is a continuation of Ser. No. 832,994, Feb. 10, 1992, abandoned, which is a division of Ser. No. 619,525, Nov. 29, 1990, abandoned. This application Apr. 28, 1994, Ser. No. 234,602**
**Int. Cl.[6] A61K** *39/385;38/10;* **C07K** *17/02;14/775*
**U.S. Cl. 424—194.1** **1 Claim**




1. A method for provoking an immune response against apolipoprotein(a), comprising administering to a mammal an immune response provoking amount of a peptide bound to a carrier, said peptide bound carrier comprising the following structure:

βAla-Lys-($Lys_2$)-($Lys_4$)-(($Gly_3$)-Ala-Val-Cys-Gly-Gly-Val-Ile-Ser-Gly-Pro-Cys-Lys-Lys-Pro-Glu-OAc)$_8$.

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**5,490,982**

**COSMETIC COMPOSITION**

**Marcina Siciliano, Naugatuck, Conn., assignor to Elizabeth Arden Company, Division of Conopco, Inc., New York, N.Y.**

**Filed Feb. 1, 1995, Ser. No. 382,353**
**Int. Cl.[6] A61K** *6/00*
**U.S. Cl. 424—401** **6 Claims**

1. A cosmetic clear microemulsion composition comprising:

(i) from 0.5 to 8% by weight of a fragrance;

(ii) from 30 to 80% of water;

(iii) from 0.5 to 8% by weight of isoeicosane; and

(iv) from 1 to 40% by weight of a caprylic/capric fatty glyceride ester ethoxylated with from 1 to 100 moles ethylene oxide per mole of glyceride.

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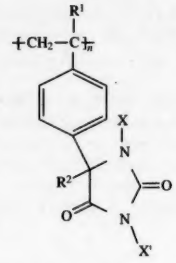
**5,490,983**

**POLYMERIC CYCLIC N-HALAMINE BIOCIDAL COMPOUNDS**

**Shelby D. Worley; Gang Sun; Wanying Sun, and Tay-Yuan Chen, all of Auburn, Ala., assignors to Auburn University, Auburn, Ala.**

**Continuation of Ser. No. 31,228, Mar. 12, 1993, abandoned. This application Jul. 28, 1994, Ser. No. 282,154**
**Int. Cl.[6] A01N** *25/00*
**U.S. Cl. 424—405** **54 Claims**

1. A biocidal polymer comprising a monomeric repeating unit of one or more structures I, II, III, IV, V, VI, VII, VIII or IX:



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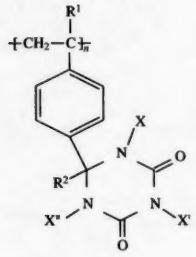
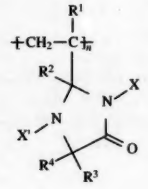
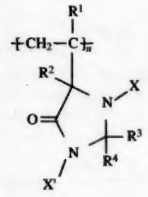


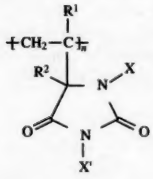
(II)



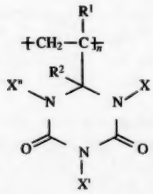
(III)



(IV)



(V)



(VI)

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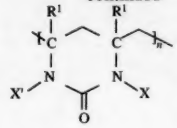
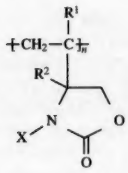
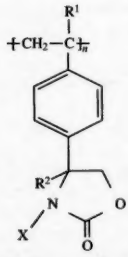


(VII)



(VIII)



(IX)

wherein X, X' and X" are independently chlorine, bromine or hydrogen, provided that at least one of X, X' and X" is chlorine or bromine; $R^1$ is hydrogen or $C_1$ to $C_4$ alkyl; $R^2$ is $C_1$– $C_4$ alkyl, benzyl or $C_1$–$C_4$ alkyl-substituted benzyl; and $R^3$ and $R^4$ are independently $C_1$–$C_4$ alkyl, phenyl, $C_1$–$C_4$ alkyl-substituted phenyl, benzyl or $C_1$–$C_4$ alkyl-substituted benzyl, or $R^3$ and $R^4$ together form a pentamethylene or tetramethylene moiety.

**45**. A method for disinfecting a habitat for halogen-sensitive microorganisms comprising contacting the habitat with a biocidal amount of a biocidal polymer as claimed in claim **1**.

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**5,490,984**

## USE OF INJECTABLE BIOMATERIALS FOR THE REPAIR AND AUGMENTATION OF THE ANAL SPHINCTERS

**Jeffrey S. Freed, New York, N.Y., assignor to JSF Consulants Ltd., New York, N.Y.**

**Division of Ser. No. 843,124, Feb. 28, 1992. This application May 18, 1995, Ser. No. 444,187**

**Int. Cl.**[6] **A61F** *2/02;* **A61K** *38/39;* **C07K** *15/20*

**U.S. Cl. 424—436** **15 Claims**

**1**. A method of inducing wound healing of a structurally defective anal sphincter comprising administering an effective amount of an injectable biomaterial, capable of persisting at the injection site for at least three months containing a therapeutically effective

amount of one or more wound healing agents, into the defect, sufficient to induce wound healing of a structurally defective anal sphincter.

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**5,490,985**

## EXTENDED DURATION ANTACID PRODUCT

**Donald F. H. Wallach, Hollis, N.H.; Rajiv Mathur, Sewell, N.J.; Jean Philippot, St. Clement la Riviere, France, and Surendra Kumar, Vineland, N.J., assignors to Micro-Pak, Inc., Wilmington, Del.**

**Continuation of Ser. No. 984,895, Dec. 2, 1992, abandoned. This application Mar. 18, 1994, Ser. No. 210,645**

**Int. Cl.[6] A61K** *9/127;33/12;33/06;33/10;31/695*

**U.S. Cl. 424—450** **30 Claims**

1. An antacid product having extended residence and duration in the gastric and upper intestinal systems comprising mixture of non-phospholipid lipid vesicles and an effective amount of a particulate base in a substantially aqueous solution, said lipid vesicles comprising 10–70% by weight of said product, and wherein said non-phospholipid is selected from the group consisting of:

diethanolamides having the formula

$$(HOCH_2—CH_2)_2NCO—R_3$$

where $R_3$ is a radical of caprylic, lauric, myristic or linoleic acids;

long chain acyl hexosamides having the formula

$$R_4—NHCO—(CH_2)_b—CH_3$$

where b ranges from 10–18 and $R_4$ is a radical of a sugar molecule selected from a group consisting of glucosamine, galactosamine, and N-methylglucamine; and

long chain acyl amino acid amides having the formula

$$R_5—CH(COOH)—NHCO—(CH_2)_c—CH_3$$

where c ranges from 10–18 and $R_5$ is a radical of an amino acid side chain;

long chain acyl amides having the formula

$$HOOC—(CH_2)_d—N(CH_3)—(CH_2)_3—NHCO—R_6$$

where $R_6$ is an acyl chain having 12–20 carbon and not more than two unsaturations, and d ranges from 1–3;

glycerol monostearate;

polyoxyethylene fatty esters having the formula

$$R_1—COO(C_2H_4O)_nH$$

where $R_1$ is a radical of lauric, myristic, cetyl, stearic, or oleic acid and

n=2–10;

polyoxyethylene fatty acid ethers, having the formula

$$R_2—CO(C_2H_4O)_mH$$

where $R_2$ is a radical of lauric, myristic, or cetyl acids, single or double unsaturated octadecyl acids, or double unsaturated eicodienoic acids and m ranges from 2–4;

polyoxyethylene (20) sorbitan mono- or trioleate;

polyoxyethylene glyceryl monostearate with 1–10 polyoxyethylene groups;

betaines; and

sarcosinamides.

**5,490,986**

## ENCAPSULATED PERFLUOROCARBONS

**Tully J. Speaker, Philadelphia, Pa., assignor to Temple University of the Commonwealth System of Higher Education2, Philadelphia, Pa.**

**PCT No. PCT/US92/06132, § 371 Date May 16, 1994, § 102(e) Date May 16, 1994, PCT Pub. No. WO93/01806, PCT Pub. Date Feb. 4, 1993**

**PCT Filed Jul. 23, 1992, Ser. No. 190,011**

**Int. Cl.[6] A61K** *9/14*

**U.S. Cl. 424—451** **15 Claims**

1. A Lewis acid-Lewis base salt film microcapsule having a microcapsule wall and perfluorocarbon as a core material, wherein said Lewis acid is selected from the group consisting of arabic acid, acacia gum carboxymethylcellulose, ghatti gum, guar gum and a polyoxyalkylene derivative of a polymeric acid having the structure

$$H(C(COOH)—C(COOR))_c—(C(COOR)—C)_dH$$

in which c- and d- type repeat units are randomly distributed within the polymer, c=70 to 3150, c-type repeat units consist essentially of from 50–90% of the total polymer, d=70–1750, the sum of c+d is in the range from about 140 to about 3500 and in which:

$$R = —(CH(H)—CH(R')—O—)_e—(CH(H)—CH(R")—O)_fH$$

where

R' and R" independently=H or $CH_3$ and e=7–75, f=7–75, and the sum of e+f=14 to 85,

and said Lewis base is a simple amine selected from the group consisting of n-hexylamine, 2,4-dimethylpentylamine, octadecylamine, ethylenediamfne, piperazine, tetraethylenetriamine and polyethyleneimine and a polyoxyalkylene adduct of an amine having the structure

$$R_1—N(CH_2—R_2)(CH_2—R_3)$$

in which, independently,

$$R_1 = H(—O—CH_2—CH(R_4)—)_a, \ a = 7–26$$

$$R_2 = —CH_2—O—R_1 \text{ or } CH_2—N—(R_1)_2$$

$$R_3 = R_2 \text{ or } —(CH_2—N(R_1)—CH_2)b—R_2, \ b = 7–26$$

and

$$R_4 = H, CH_3 \text{ or alkyl,}$$

wherein when said Lewis base is a polyoxyalkylene adduct of an amine said Lewis acid is not a polyoxyalkylene derivative of a polymeric acid, and when said Lewis acid is a polyoxyalkylene derivative of a polymeric acid said Lewis base is not a polyoxylene adduct of an amine, and

wherein said Lewis acid is in a concentration of 1–10% weight by volume and said Lewis base is in a stoichiometric amount sufficient to form a neutral salt film.

**5,490,987**

## TABLETING OF COLESTIPOL HYDROCHLORIDE

**Robert W. Shen, Kalamazoo, and Jeffrey E. Price, Schoolcraft, both of Mich., assignors to The Upjohn Company, Kalamazoo, Mich.**

**PCT No. PCT/US92/05066, § 371 Date Dec. 30, 1993, § 102(e) Date Dec. 30, 1993, PCT Pub. No. WO93/00915, PCT Pub. Date Jan. 21, 1993**

**Continuation-in-part of Ser. No. 725,044, Jul. 3, 1991, abandoned. This PCT application Jun. 23, 1992, Ser. No. 175,412**

**Int. Cl.[6] A61K** *9/20;9/36*

**U.S. Cl. 424—464** **17 Claims**

1. A pharmaceutical tablet which comprises approximately 1000 mg of fine-milled colestipol hydrochloride, 10–200 mg of povidone, 1–50 mg of colloidal silicon dioxide and 1–30 mg of magnesium stearate, and which has the following physical characteristics:

| | |
|---|---|
| Hardness: | Greater than 40 SCU's |
| Friability: | 0–0.1%/15 minutes. |

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**5,490,988**

## DELIVERY OF THERAPEUTIC AGENTS TO A TARGET SITE

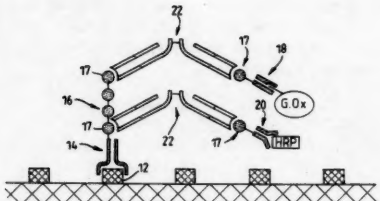
**Thomas S. Beggs, Bedford; Paul J. Davis, Bedfordshire, and Martine E. Verhoeyen, Northants, all of, England, assignors to Chesebrough-Pond's USA Co., Division of Conopco, Inc., Greenwich, Conn.**

**Continuation of Ser. No. 22,781, Feb. 23, 1993, abandoned, which is a continuation of Ser. No. 771,670, Oct. 4, 1991, abandoned. This application Nov. 8, 1994, Ser. No. 335,925**

**Claims priority, application United Kingdom, Jan. 5, 1990, 90211671**

**Int. Cl.[6] A61K** *7/16;9/20;39/00*

**U.S. Cl. 424—464** **10 Claims**




1. A product for treating a human body target site, which site is located in the human mouth and is accessible by topical application, with a therapeutic agent, said product being selected from the group consisting of mouthwash, toothpaste, and lozenge, said product comprising:

(a) a therapeutic agent;

(b) a first antibody formed from at least one peptide chain and which is able to bind to the target site through antibody-antigen binding, said first antibody fragment having a first additional peptide other than a fragment of the same antibody, appended thereto through a covalent peptide bond; and

(c) a second antibody fragment able to bind through antibody-antigen binding to said first additional peptide and to bind the therapeutic agent to said first additional peptide, whereby in use of the product binding of the first antibody fragment to the target site holds the therapeutic agent on the target site, for the therapeutic agent to act on the target site.

**5,490,989**

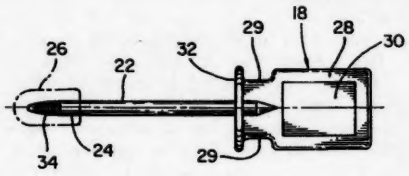
## HOLDER AND PACKAGING FOR A HARDENED MEDICATED MATRIX

**Michelle A. Hadaway, Gurnee; David E. Kramer, Northbrook, and Robert J. Best, Winthrop Harbor, all of Ill., assignors to Abbott Laboratories, Abbott Park, Ill.**

**Division of Ser. No. 776,543, Oct. 11, 1991, Pat. No. 5,296,234. This application Dec. 29, 1993, Ser. No. 175,003**

**Int. Cl.[6] A61K** *9/14*

**U.S. Cl. 424—484** **6 Claims**




1. A protective overcap for a stick holder having a hardened medicated matrix affixed to a first end portion of the stick holder, said protective overcap comprising a tubular plastic member having a first, closed end and a second, open end opposite said first end, said protective overcap constructed to be fit over the first end portion of the stick holder having a hardened, medicated matrix affixed thereto, and a detent mounted on said protective overcap proximate said second, open end of said protective overcap said detent being constructed to limit movement of the stick holder within said protective overcap and to retain releasably the first end portion of the stick holder within said protective overcap.

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**5,490,990**

## PRODUCTION OF SOLID PHARMACEUTICAL DEPOT FORMS

**Sven Grabowski, Ludwigshafen; Astrid Kah-Helbig, Neustadt; Axel Sanner, Frankenthal, and Kurt Wendel, Ludwigshafen, all of, Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Germany**

**Filed Jun. 21, 1993, Ser. No. 78,824**

**Claims priority, application Germany, Jun. 25, 1992, 42 20 782.7**

**Int. Cl.[6] A61K** *47/32;9/20*

**U.S. Cl. 424—486** **18 Claims**

1. A process for the production of solid pharmaceutical depot forms by application of an aqueous dispersion, reconstituted by the addition of water to a pharmaceutically acceptable binder, to a core which contains active substance, wherein the binder is prepared by emulsion polymerization of an ethylenically unsaturated compound selected from the group consisting of $C_{1-18}$ alkyl(meth)acrylates, hydroxyalkyl(meth)acrylates, vinyl esters, vinyl lactams, mono- or dicarboxylic acids, monoesters or monoamides of these acids, N-vinylimidazole, N-vinylimidazoline, N-vinylimidazolidine, N-vinylpyridine, monoalkyl- or dialkylaminoalkyl esters or monoalkyl- or dialkylaminoalkylamides of polymerizable carboxylic acids, acrylamidoalkylsulfonic acids, trimethylammonioethyl methacrylate chloride and methylol(meth)acrylamides, which produces a water insoluble polymer, and subsequent spray drying of the resulting aqueous polymer dispersion with 5–50% by weight of a water-soluble pharmaceutically acceptable spraying aid selected from the group consisting of cellulose derivatives, polyvinylpyrrolidones, copolymers of N-vinylpyrrolidone and vinylacetate, starch derivatives and polyvinylalcohols with a glass transition temperature of at least 60° C. and 0–50% by weight, based on the amount of binder, of a pharmaceutically acceptable antiblocking agent, the solid pharmaceutical depot forms exhibiting undiminished release properties of the active substance of the core.

5,490,991

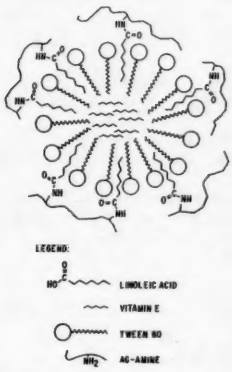
## DIRECTED DELIVERY OF RADIOPROTECTANTS USING A RECEPTOR SPECIFIC CARRIER

**Philip Enriquez, Sheldonville; Chu W. Jung, Arlington, and Ernest V. Groman, Brookline, all of Mass., assignors to Advanced Magnetics, Inc., Cambridge, Mass.**

**Continuation-in-part of Ser. No. 900,686, Jun. 17, 1992, which is a continuation-in-part of Ser. No. 938,873, Aug. 27, 1992, Pat. No. 5,336,506, which is a continuation of Ser. No. 630,017, Dec. 19, 1990, abandoned, which is a continuation-in-part of Ser. No. 679,526, Apr. 2, 1991, Pat. No. 5,141,739, which is a continuation of Ser. No. 384,991, Jul. 28, 1989, abandoned, which is a continuation of Ser. No. 228,640, Aug. 4, 1988, abandoned, which is a continuation-in-part of Ser. No. 76,586, Jun. 26, 1987, Pat. No. 4,827,945, which is a continuation-in-part of Ser. No. 882,044, Jun. 13, 1985, Pat. No. 4,698,302. This application Apr. 5, 1993, Ser. No. 43,611**

**Int. Cl.[6] A61K** *9/127*

**U.S. Cl. 424—488** **12 Claims**




1. A method of treating a mixture of cells containing target cells to be destroyed by radiation therapy and non-target cells so as to protect specific non-target cells in the mixture against damage, comprising:

(i) selecting a radioprotectant compound;

(ii) forming a complex of the radioprotectant compound and a carrier wherein the carrier is both (i) a polysaccharide, and (ii) capable of being bound to a receptor mediated endocytosis (RME) receptor, the RME receptor being present on the non-target cells and substantially absent on the target cells; and

(iii) administering the complex to the mixture of cells.

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5,490,992

## DISINFECTANT COMPOSITION

**Jeffrey F. Andrews, Stillwater, and Janet F. Munson, Plymouth, both of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.**

**Division of Ser. No. 121,283, Sep. 14, 1993, abandoned. This application Mar. 22, 1995, Ser. No. 407,965**

**Int. Cl.[6] A01N** *37/02;59/26;* **A23B** *4/027;4/12*

**U.S. Cl. 424—606** **10 Claims**

1. A method of disinfecting a poultry carcass comprising the step of contacting the carcass with a composition consisting essentially of effective amounts of

a) a fatty acid monoester selected from the group consisting of glycerol and propylene glycol monoesters of caprylic, capric and lauric acid;

b) an acid or chelating agent selected from the group consisting of lactic acid, tartaric acid, adipic acid, succinic acid, citric acid, ascorbic acid, malic acid, mandelic acid, acetic acid, sorbic acid, sodium acid pyrophosphate, acidic sodium hexametaphosphate, and ethylenediaminetetraacetic acid and salts thereof;

c) a food grade anionic surfactant; and

d) a vehicle;

wherein the amounts of a), b) or c) in the composition either taken alone or as a combination of a) and b), a) and c), or b) and c) do not have effective antimicrobial activity, wherein said effective antimicrobial activity is activity against both gram-negative and gram-positive bacteria by killing the bacteria within about two minutes of contact with the composition to provide a log reduction of greater than about 5.91 when contacted with an inoculum having an initial bacterial concentration of about $10^6$ to $10^8$ cells per ml.

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5,490,993

## METHOD OF PREPARING A PROTEINACEOUS FOOD PRODUCT CONTAINING A MELT SPUN MATRIX AND PRODUCT THEREOF

**Richard C. Fuisz, Great Falls, Va., assignor to Fuisz Technologies Ltd., Chantilly, Va.**

**Division of Ser. No. 289,926, Aug. 12, 1994, Pat. No. 5,431,950, which is a division of Ser. No. 163,120, Dec. 6, 1993, Pat. No. 5,374,447, which is a division of Ser. No. 80,479, Jun. 22, 1993, Pat. No. 5,286,513, which is a division of Ser. No. 851,650, Mar. 16, 1992, Pat. No. 5,236,734, which is a continuation-in-part of Ser. No. 602,485, Oct. 24, 1990, Pat. No. 5,096,492, which is a continuation-in-part of Ser. No. 169,838, Mar. 18, 1988, Pat. No. 4,855,326, which is a continuation-in-part of Ser. No. 40,371, Apr. 20, 1987, abandoned. This application Mar. 24, 1995, Ser. No. 410,333**

**Int. Cl.[6] A23L** *1/314;1/315;1/317*

**U.S. Cl. 426—92** **4 Claims**

1. A method of preparing a food product, comprising mixing a matrix, formed by melt-spinning a mixture of an oleaginous substance and a saccharide carrier to provide internal flow thereby permitting transition in structure with degradation of said oleaginous substance and saccharide carrier with a ground meat material maintained at a temperature of above freezing but below 5° C. to form a mixed composition and then promptly freezing such mixed composition.

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5,490,994

## METHOD OF STABILIZING THE COLOR OF THE DISODIUM SALT OF 5,5'-INDIGOTIN DISULFONIC ACID

**Helena S. Soedjak, N. Tarrytown, N.Y., assignor to Kraft Foods, Inc., Northfield, Ill.**

**Filed Jul. 27, 1994, Ser. No. 281,392**

**Int. Cl.[6] A23L** *1/275*

**U.S. Cl. 426—262** **7 Claims**

1. A method for stabilizing the blue color of a disodium salt of 5,5'-indigotin disulfonic acid in an aqueous fruit-flavored dessert gel having a pH of less than 4.5 and which is contained in an aluminum container by adding to said gel an amount of a complexing agent selected from the group consisting of tannic acids, ortho-phenanthroline, apoferritin and combinations thereof, said complexing agent being added at a weight level of from 0.5–5.0 times the level of the disodium salt of 5,5'-indigotin disulfonic acid, the level of the complexing agent being below its taste threshold level in the gel.

**5,490,995**

## SOLID NONDIGESTIBLE POLYOL POLYESTERS CONTAINING ESTERIFIED HYDROXY FATTY ACIDS SUCH AS ESTERIFIED RICINOLEIC ACID

**Patrick J. Corrigan, Cincinnati, Ohio, assignor to The Procter & Gamble Company, Cincinnati, Ohio**

**Filed Oct. 30, 1992, Ser. No. 968,792**

**The portion of the term of this patent subsequent to Jan. 11, 2011, has been disclaimed.**

**Int. Cl.[6] A23L** *1/00*

**U.S. Cl. 426—531** **20 Claims**

1. A nondigestible polyol fatty acid polyester having a complete melting point above about 25° C., said polyol polyester comprising:

(a) a polyol moiety containing at least 4 hydroxyl groups with at least 4 of said hydroxyl groups being esterified; and

(b) ester groups consisting essentially of

(i) at least about 15% $C_{20}$ or higher long chain saturated fatty acid radicals, and

(ii) fatty-fatty acid radicals comprising a hydroxyl group-containing fatty acid radical wherein said hydroxyl group is itself esterified with a fatty acid radical;

the average molar ratio of said fatty-fatty acid radicals to said $C_{20}$ or higher long chain saturated fatty acid radicals ranging from about 0.1:7.9 to about 3:5.

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**5,490,996**

## PROCESS FOR PRODUCING AN IMPROVED SUCROSE-FREE MILK CHOCOLATE

**Claude Despland, Neuchatel; Christophe Gnagi, Vilars, and Giacomo Podavini, Neuchatel, all of, Switzerland, assignors to Kraft Jacobs Suchard AG, Zurich, Switzerland**

**Filed Jan. 11, 1994, Ser. No. 179,862**

**Int. Cl.[6] A23G** *1/00*

**U.S. Cl. 426—548** **8 Claims**

1. A process for producing an improved sucrose-free milk chocolate which comprises the steps:

(A)

(1) separately mixing a sucrose substitute selected from the group consisting of polydextrose, inulin, mannitol, maltitol and combinations thereof with milk powder, cocoa butter and an edible emulsifier;

(2) refining and conciting the product of (A) (1) at temperatures in the range from about 70° C. to about 100° C. for a period of time to liquefy the product and to form an improved flavor;, and

(B)

(1) separately mixing a sucrose substitute selected from the group consisting of lactitol, fructose, sorbitol, mannitol, xylitol, isomalt and combinations thereof, with cocoa mass, cocoa butter and an edible emulsifier;

(2) refining and conching the product of (B) (1) at temperatures in the range from about 35° C. to about 60° C. for a period of time to liquefy the product;

(C) blending the liquid, flavor-producing product of (A) and the liquid, chocolate-product of (B) at temperatures in the range from about 40° C. to about 50° C. to produce an improved-flavored, sucrose-free milk chocolate.

**5,490,997**

## EDIBLE FIBER-CONTAINING PRODUCT AND COMPOSITION

**Denise L. Devine, Moylan; Sheila M. Katz, Gladwyne, both of Pa.; Peter M. Salmon, and M. Lynne Sweet, both of Ithaca, N.Y., assignors to Devine Foods, Inc., Media, Pa.**

**Continuation of Ser. No. 89,148, Jul. 8, 1993, Pat. No. 5,407,694, which is a division of Ser. No. 769,412, Oct. 1, 1991, Pat. No. 5,234,704. This application Apr. 17, 1995, Ser. No. 423,608**

**Int. Cl.[6] A23L** *2/02*

**U.S. Cl. 426—573** **32 Claims**

1. An edible product for use as a component of a shelf-stable composition comprising an aqueous suspension of the edible product, the edible product comprising a microparticulated dietary fiber derived from a dietary fiber source selected from the group consisting of a grain and a vegetable, the fiber having an insoluble fiber content of at least about 2.5 percent by weight of the dietary fiber source, and hydrocolloid in an amount sufficient to maintain the fiber in suspension in the edible composition.

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**5,490,998**

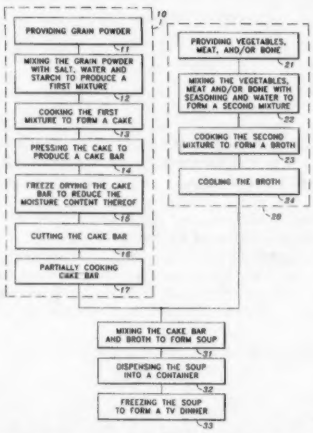
## METHOD FOR PREPARING GRAIN CAKE HEALTH SOUP

**Ki I. Kim, 826 S. Berando St., Apt. 1, Los Angeles, Calif. 90005, and Soo K. Rho, 17535 Horace St., Granada Hills, Calif. 91344**

**Continuation-in-part of Ser. No. 190,591, Jan. 31, 1994. This application Mar. 16, 1994, Ser. No. 213,850**

**Int. Cl.[6] A23L** *1/238*

**U.S. Cl. 426—589** **15 Claims**


10
PROVIDING GRAIN POWDER
11
MIXING THE GRAIN POWDER WITH SALT, WATER AND STARCH TO PRODUCE A FIRST MIXTURE
12
COOKING THE FIRST MIXTURE TO FORM A CAKE
13
PRESSING THE CAKE TO PRODUCE A CAKE BAR
14
FREEZE DRYING THE CAKE BAR TO REDUCE THE MOISTURE CONTENT THEREOF
15
CUTTING THE CAKE BAR
16
PARTIALLY COOKING CAKE BAR
17
PROVIDING VEGETABLES, MEAT, AND/OR BONE
21
MIXING THE VEGETABLES, MEAT AND/OR BONE WITH SEASONING AND WATER TO FORM A SECOND MIXTURE
22
COOKING THE SECOND MIXTURE TO FORM A BROTH
23
COOLING THE BROTH
24
20
MIXING THE CAKE BAR AND BROTH TO FORM SOUP
31
DISPENSING THE SOUP INTO A CONTAINER
32
FREEZING THE SOUP TO FORM A TV DINNER
33

1. A method for producing grain cake health soup, said method comprising the steps of:

a) preparing grain cake according to the steps of:

i) providing grain powder;

ii) mixing the grain powder with salt, water, and starch to produce a first mixture;

iii) cooking the first mixture to form a cake;

iv) pressing the cake to form a cake bar;

v) freeze drying the cake bar to remove a quantity of water therefrom;

vi) slicing the cake bar;

vii) partially recooking the sliced cake bar;

b) separately preparing at least one of meat and bone according to the steps of:

i) providing at least one of meat and bone;

ii) mixing at least one of meat and bone with salt and water to produce a second mixture;

iii) cooking the second mixture to form a broth;

iv) cooling the broth;
c) mixing the sliced cake bar and broth to form soup; and
d) dispensing the soup into a container; and
e) freezing the soup.

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**5,490,999**

**PROCESS FOR MAKING REDUCED FAT NUT SPREADS**

**Francisco V. Villagran, West Chester; Gregory M. McCabe, Cincinnati, and Vincent Y.-L. Wong, Hamilton, all of Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio**

**Filed Apr. 4, 1994, Ser. No. 222,770**
**Int. Cl.[6] A23L** *1/38*
**U.S. Cl. 426—633** **10 Claims**

1. A process for preparing a high protein, low fat nut spread using a sequential solid addition comprising the steps of:
a) mixing from about 15% to about 50% non-protein solid ingredients with from about 50% to about 85% nut paste wherein the mixture is continuously recycled through a homogenizer and colloid mill to maintain the Casson plastic viscosity at less than 30 poise;
b) mixing protein containing solids with the nut paste mixture prepared in step (a) wherein the mixture is continuously recycled through a homogenizer and colloid mill;
c) when the solids have been added and the resultant nut paste has a bimodal particle size distribution such that at least 50% of the solids have a particle size of less than 18 microns and 90% of the solids have a particle size of less than 60 microns, and a Casson plastic viscosity of from about 8 to about 20 poise, cooling the paste to less than 50° C. to provide a nut spread; and
d) adding from about 5% to about 20% nut granules of full fat nuts or high fat chips to the cooled nut paste.

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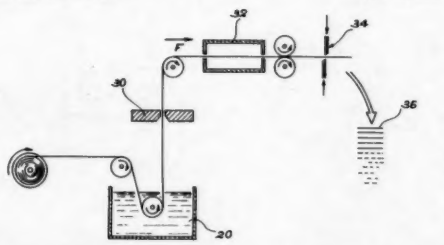
**5,491,000**

**PROCESS FOR THE PRODUCTION OF A CARBON/CARBON COMPOSITE MATERIAL PART USING MESOPHASE POWDER**

**Dominique Hocquellet, Medard en Salles, and Jean P. Chenier, Le Taillan Medoc, both of, France, assignors to Aerospatiale Societe Nationale Industrielle, Paris, France**

**Filed Feb. 24, 1993, Ser. No. 22,728**
**Claims priority, application France, Feb. 28, 1992, 92 02386**
**Int. Cl.[6] B05D** *5/12;* **B32B** *9/00*
**U.S. Cl. 427—113** **18 Claims**




1. Process for the production of a composite material part having a carbon fibre reinforcement embedded in a carbon matrix involving the stages of dispersing infusible mesophase microspheres in a solution containing a binder and a solvent able to wet the carbon fibres and thus form an impregnation bath (**20**), the binder and the solvent not being carbon precursors, impregnating each fibre (**1**) by the bath, placing (**24**) the impregnated fibres in a mould and unidirectionally pressing (**26**) the impregnated fibres in the mould whilst heating them to a first temperature $T_1$ exceeding ambient temperature and able to evaporate the solvent and the binder and make the mesophase microspheres flow and then to a second temperature $T_2$ exceeding the first temperature and able to pyrolyze the mesophase microspheres in coke form.

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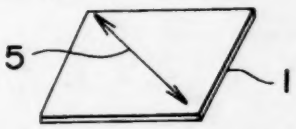
**5,491,001**

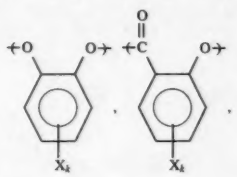
**METHOD FOR PRODUCING VIEWING ANGLE COMPENSATOR FOR LIQUID CRYSTAL DISPLAY**

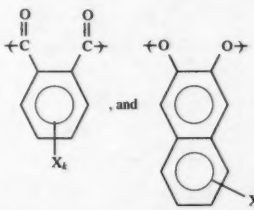
**Hitoshi Mazaki, Kawasaki; Takehiro Toyooka, and Hiroyuki Itoh, both of Yokohama, all of, Japan, assignors to Nippon Oil Company, Limited, Tokyo, Japan**

**Continuation-in-part of Ser. No. 939,166, Sep. 2, 1992, abandoned. This application Mar. 9, 1994, Ser. No. 208,445**
**Claims priority, application Japan, Sep. 3, 1991, 3-248482**
**Int. Cl.[6] B05D** *5/06*
**U.S. Cl. 427—162** **6 Claims**




1. A method for producing a viewing angle compensator for a liquid crystal display comprising the steps of:
(i) applying a coating to a light transmitting substrate having an alignment layer thereon wherein said coating comprises (A) an optically active polyester containing as a constituent a hydrocarbon unit selected from the group consisting of (a) a radical selected from the group consisting of






where X is chlorine or bromine, $C_1$–$C_4$ alkoxy, $C_1$–$C_4$ alkyl or phenyl, and k is 0 to 2: (b) polycyclic hydrocarbon units; and (c) aromatic units having a substituent selected from the group consisting of a hydrocarbon group of 3 to 8 carbon atoms, a halogen atom and mixtures thereof, with the proviso that these units exclude the units encompassed by (a); or (B) a composition containing a liquid crystalline polyester which contains said hydrocarbon unit as a constituent and an optically active compound;
(ii) heat treating the applied coating of step (i) at a temperature higher than the glass transition temperature of the polyester to form a cholesteric structure; and
(iii) cooling said heat-treated coating to a temperature lower than said glass transition temperature to solidify said cholesteric structure, thereby producing a viewing angle compensator wherein said compensator has a product (Δn·p), calculated by multiplying birefringence (Δn) by pitch length (p) of the heat-treated coating, of less than 600 nm.

5,491,002

## MULTILAYER CVD DIAMOND FILMS

David E. Slutz, Columbus, Ohio, assignor to General Electric Company, Worthington, Ohio

Continuation of Ser. No. 128,042, Sep. 27, 1993, abandoned, which is a continuation of Ser. No. 855,391, Mar. 20, 1992, abandoned. This application Mar. 8, 1995, Ser. No. 400,555

Int. Cl.[6] C23C *16/00;* H05H *1/24*

U.S. Cl. 427—249 2 Claims

1. A method for forming a multilayer chemical vapor deposited (CVD) diamond film, consisting essentially of the steps of:

(1) depositing diamond on a heated substrate by impingement with an excited hydrocarbon-hydrogen gas mixture under conditions of temperature, pressure and gas concentration which promote diamond nucleation and growth on the substrate;

(2) interrupting the diamond growth of said step (1);

(3) depositing a metal carbide layer of less than 0.01 microns suitable for nucleating diamond on the diamond formed in said step (1); and

(4) reinitiating said step (1).

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5,491,003

## METHOD FOR MANUFACTURING AN OPTICAL RECORDING FILM COMPOSED OF A METAL AND AN OXIDE WHICH CAN UNDERGO AN OXIDATION-REDUCTION REACTION UPON EXPOSURE TO A LASER BEAM

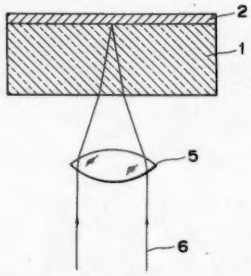
Nobuo Akahira, Yawata, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Continuation of Ser. No. 863,037, Apr. 6, 1992, abandoned, which is a division of Ser. No. 666,661, Mar. 8, 1991, abandoned. This application Oct. 5, 1993, Ser. No. 131,933

Claims priority, application Japan, Mar. 8, 1990, 2-057170

Int. Cl.[6] C23C *14/24;14/34*

U.S. Cl. 427—255.3 8 Claims




1. A method for manufacturing an optical recording medium having an optical recording film which is formed on a substrate and is capable of producing an optically detectable change upon irradiation with a laser beam, said method comprising the steps of:

separately preparing evaporation sources for a metal and an oxide, respectively, said oxide having a standard enthalpy of formation larger than that of an oxide of said metal, said metal and said oxide being such that, when mixed together or laminated in contact with each other and subsequently heated, result in a reduction reaction therebetween; and

vacuum-depositing said metal and said oxide, supplied from said respective evaporation sources, on said substrate simultaneously or alternately to form said optical recording film without inducing the reduction reaction between the metal and the oxide during the vacuum-depositing step;

said optical recording film so formed containing the metal and the oxide in a mixed or laminated form and having a property of being susceptible to the reduction reaction, when said optical recording film is irradiated by a laser beam, to thereby induce the optically detectable change.

5,491,004

## PROCESS FOR APPLYING A LOW SOILING FIBER FINISH

Elbert H. Mudge, and Thomas D. Brabson, both of Charlotte, N.C., assignors to Henkel Corporation, Plymouth Meeting, Pa.

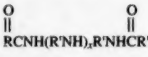
Filed May 26, 1994, Ser. No. 249,590

Int. Cl.[6] B05D *3/02*

U.S. Cl. 427—393.4 14 Claims

1. A method for applying a low soil secondary finish to synthetic fibers comprising treating spun fibers with a coating effective quantity of a composition comprising a dry waxy component solid at room temperature selected from at least one compound from the group consisting of

A) a bisamide of the formula




(I)

wherein R and R" can be the same or different and are straight or branched alkyl groups having from 7 to 19 carbon atoms, R' is a $C_2$–$C_4$ linear alkyl group, and x is an integer of from 0 to 5;

B) a block copolymer of ethylene oxide and propylene oxide;

C) the reaction product of a $C_{8-30}$ saturated fatty amine or a phenol with from 2 to 250 moles of ethylene oxide, and

D) a $C_{8-22}$ fatty acid ester;

provided that the composition cannot consist of a combination of DETA bisstearamide, POE (30) stearyl alcohol, and POE (40) cetyl/stearyl alcohol in a molar ratio of 17:2.25:0.75 as the dry, waxy component.

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5,491,005

## GOLD THIN FILM VAPOR GROWING METHOD

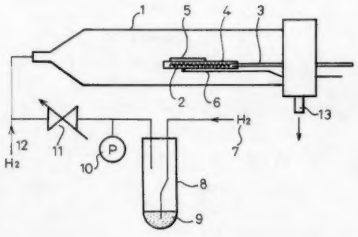
Masataka Hoshino, Kawasaki, Japan, assignor to Fujitsu Limited, Kawasaki, Japan

Continuation of Ser. No. 17,255, Feb. 12, 1993, abandoned. This application Oct. 4, 1994, Ser. No. 317,838

Claims priority, application Japan, May 25, 1992, 4-156159; Nov. 13, 1992, 4-303751; Jan. 26, 1993, 5-028454

Int. Cl.[6] H05H *1/24;* C23C *16/00;* C30B *29/52*

U.S. Cl. 427—576 15 Claims




1. A method for forming a gold film on a substrate by a chemical vapor deposition, comprising the steps of:

supplying a gold source gas into a reactor;

adjusting a temperature within the range of about 150° to about 240° C. in the reactor at a pressure of at least 10 Torr to attain a kinetically controlled region in the reactor; and

depositing a gold film from the gold source gas onto the substrate, the gold film being deposited onto said substrate substantially without forming needle-shape crystals.

5,491,006

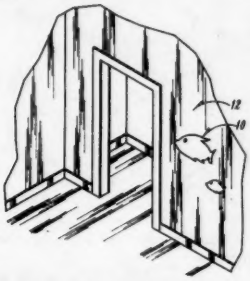
**RELEASABLY MOUNTABLE WALL ORNAMENT**

**Constance A. Johnson, West Des Moines, Iowa, and Harold L. McVeigh, West Palm Beach, Fla., assignors to Whimsical Walls, Inc., West Des Moines, Iowa**

**Filed Mar. 16, 1994, Ser. No. 213,932**

**Int. Cl.[6] E04F** *13/00*

**U.S. Cl. 428—13** **14 Claims**




1. An ornament for a wall comprising:

a lightweight, rigid substrate having a central layer including a first side and a second side, a design surface positioned adjacent said first side of said central layer, and a backing positioned adjacent said second side of said central layer;

a design expression fixed on said design surface; and

adhesive means attached to said backing for coupling said ornament to said wall, said adhesive means being both removable from said backing and said wall and reusable.

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5,491,007

**CARVABLE ARTIFICIAL PUMPKIN AND METHOD**

**Jeffrey A. Chapman, 426 N. 44th St., #100, Phoenix, Ariz. 85008**

**Division of Ser. No. 29,466, Mar. 11, 1993, Pat. No. 5,397,609. This application Jan. 6, 1995, Ser. No. 369,7[illegible]**

**The portion of the term of this patent subsequent to Mar. 14, 2012, has been disclaimed.**

**Int. Cl.[6] A41G** *1/00*

**U.S. Cl. 428—17** **27 Claims**

1. A carvable novelty article comprising:

(a) a generally spheroidal, rigid shell comprised of polyurethane foam substantially surrounding an empty interior volume and having an external surface shaped and sized to represent a pumpkin;

(b) wherein the polyurethane foam is of a composition, density, and thickness such that the article can be carved with a pocketknife; and

(c) a thin, elastomeric coating on the exterior surface of the shell.

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5,491,008

**CELLULOSE-BASED PACKAGE MATERIAL HAVING AN INCREASED ADSORPTION CAPACITY AND PROCESS FOR THE MANUFACTURE THEREOF**

**Gábor Joó, Ullöi út 81., H-1091 Budapest, and László Tóth, VI., Szegfü u. 63, H-2800 Tatabánya, both of, Hungary**

**PCT No. PCT/HU92/00015, § 371 Date Dec. 10, 1993, § 102(e) Date Dec. 10, 1993, PCT Pub. No. WO92/18013, PCT Pub. Date Oct. 29, 1992**

**PCT Filed Apr. 1, 1992, Ser. No. 129,168**

**Claims priority, application Hungary, Apr. 17, 1991, 1256/91; Mar. 23, 1992, 9407/92**

**Int. Cl.[6] B29D** *22/00;* **B65D** *85/50;* **D21H** *11/00*

**U.S. Cl. 428—34.2** **7 Claims**

1. A cellulose-based package material having an increased absorption capacity, comprising:

cellulose fibers having in their substance, or on their surface a mixture of fulvic acid and humic acid, or a salt thereof,

provided that the cellulose fibers have been treated with an aqueous colloidal solution containing the mixture of fulvic acid and humic acid, or the salt thereof, and wherein the solution has a dry material content of 4–5% by weight and a strongly alkaline pH value of 11–12.

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5,491,009

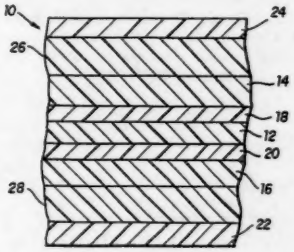
**AMORPHOUS NYLON COMPOSITION AND FILMS**

**Solomon Bekele, Taylors, S.C., assignor to W. R. Grace & Co.-Conn., Duncan, S.C.**

**Filed Aug. 3, 1990, Ser. No. 562,514**

**Int. Cl.[6] B29D** *22/00;* **B32B** *27/08*

**U.S. Cl. 428—35.7** **9 Claims**




1. A high oxygen barrier implosion resistant film comprising:

a) a first layer comprising a heat sealable polymeric material;

b) a second layer comprising an olefin polymer or copolymer;

c) a third layer comprising a polymeric adhesive;

d) a fourth layer comprising amorphous nylon;

e) a fifth layer comprising an oxygen barrier material;

f) a sixth layer comprising amorphous nylon;

g) a seventh layer comprising a polymeric adhesive;

h) an eighth layer comprising an olefin polymer or copolymer; and

i) a ninth layer comprising a heat resistant polymeric material.

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5,491,010

**CONTAINER WITH A LABEL ADHERED TO THE CONTAINER**

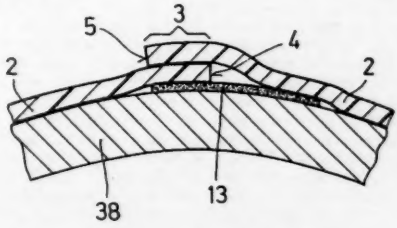
**Erich Eder, Donaustauf, Germany, assignor to Krones AG Hermann Kronseder Maschinenfabrik, Neutraubling, Germany**

**Division of Ser. No. 71,464, Jun. 2, 1993, which is a continuation-in-part of Ser. No. 820,132, Jan. 13, 1992, abandoned. This application Sep. 20, 1994, Ser. No. 308,996**

**Claims priority, application Germany, Aug. 1, 1991, 41 25 472.4**

**Int. Cl.[6] B65D** *23/08*

**U.S. Cl. 428—35.7** **3 Claims**




1. A container having a cylindrical section,

a label having a leading end portion and a trailing end portion and at least a strip of adhesive interposed between said leading end portion of said label and the container, said adhesive attaching said leading end portion of the label to said cylindrical section of the container,

said label is wrapped around said container and said trailing end portion of the label overlaps said leading end portion and there is no adhesive between said leading and trailing end portions, and

said trailing end portion is bonded by heat fusion to said leading end portion of said label.

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**5,491,011**

**THERMOPLASTIC MULTILAVER ETHYLENE POLYMER SHEET FOR CONTAINMENT OF ODORIFEROUS PRODUCT COMPONENTS**

**Paul Pezzoli, and Randal Bollinger, both of Topeka, Kans., assignors to Colgate-Palmolive Company, Piscataway, N.J.**

**Filed Jan. 25, 1994, Ser. No. 186,243**

**Int. Cl.[6] B29D** *22/00*

**U.S. Cl. 428—36.7** **7 Claims**

LINEAR LOW POLYETHYLENE - 11
HIGH DENSITY POLYETHYLENE - 12
LINEAR LOW DENSITY POLYETHYLENE - 13
BARRIER RESIN - 14
LOW DENSITY POLYETHYLENE - 15

**1**. A recyclable multilayer sheet for constructing packages for products having odoriferous fugitive components the multilayer sheet comprising a three layer coextrudate having a core layer of high density polyethylene sandwiched between first and second layers of linear low density polyethylene, a layer comprised of an polymeric odor barrier material adhered to the one of the linear low density polyethylene layers and a layer of low density polyethylene adhered to the odor barrier material.

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**5,491,012**

**USE OF A STRIP OF AN ADHESIVE FILM FOR A RE-RELEASABLE ADHESIVE BOND**

**Bernd Lühmann, Norderstedt, and Andreas Junghans, Hamburg, both of, Germany, assignors to Beiersdorf Aktiengesellschaft, Hamburg, Germany**

**Filed Jul. 1, 1993, Ser. No. 87,622**

**Claims priority, application Germany, Jul. 11, 1992, 42 22 849.2**

**Int. Cl.[6] C09J** *7/02*

**U.S. Cl. 428—40** **6 Claims**

**1**. A strip of adhesive film for a releasable adhesive bond consisting of thermoplastic elastomer and tackifying resins of a composition to be self-adhesive, the adhesive film being elastic and non-plastic and the adhesion being lower than the cohesion, the adhesive strength disappearing during extension of the film, the ratio of peel strength to tear strength being at least 1:1.5, and an adhesive bond produced therewith being releasable by pulling on the adhesive film in the direction of the plane of adhesion, the strip having two ends of which one is provided with a UV-opaque covering which at the same time serves as a tab of about 8 to 25 mm in length for pulling, the UV-opaque covering being dimensionally stable and comprising a UV-opaque plastic film laminated both sides of the adhesive film, the strip having adhesive exposed on both surfaces with the pulling tab adjacent one end.

**5,491,013**

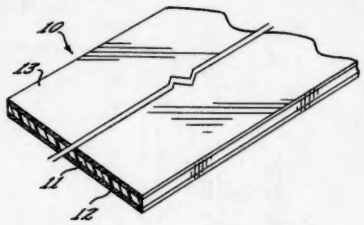
**STATIC-DISSIPATING ADHESIVE TAPE**

**Leonard Holley, Edgemon, S.C., assignor to Rexam Industries Corp., Matthews, N.C.**

**Filed Aug. 31, 1994, Ser. No. 299,236**

**Int. Cl.[6] C01B** *33/26;* **C09J** *7/02*

**U.S. Cl. 428—40** **17 Claims**




**1**. An electrostatic dissipating packaging tape comprising:

a transparent substrate;

a substantially transparent adhesive layer on one surface of said substrate; and

a transparent clay coating on the opposite surface of said substrate from said adhesive, said clay coating providing a surface resistivity of less than $10^{14}$ ohms per square and greater than zero when present on said opposite surface in amounts that are low enough to remain transparent; and

said clay being present in said coating on said substrate surface in an amount sufficient to provide said coating with a surface resistivity of less than $10^{14}$ ohms per square and greater than zero, but less than an amount that would substantially reduce the transparent optical properties of said packaging tape.

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**5,491,014**

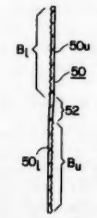
**NON-SLIP FILM LEADER**

**Vincent J. Ranoia, 504 Westbourne Cir., and Joseph J. Ranoia, 114 Acadamy La., both of Broomall, Pa. 19008**

**Continuation of Ser. No. 159,549, Dec. 1, 1993, abandoned, which is a continuation-in-part of Ser. No. 867,824, Apr. 13, 1992, abandoned. This application Mar. 8, 1995, Ser. No. 401,085**

**Int. Cl.[6] B32B** *3/00;23/02*

**U.S. Cl. 428—156** **6 Claims**




**1**. A film leader device for use with microfilm, comprising:

a) an elongated generally rectangular strip of plastic material having generally parallel opposing side edges and top and bottom faces;

b) means defining knurling of a predetermined pattern on at least a portion of said top face and covering only the area adjacent one side edge thereof; c) means defining knurling of a predetermined pattern on at least a portion of the lower face and covering only the area adjacent a side edge thereof opposite said one side edge of the top face; and

d) means defining an unknurled zone at the center of the strip between the knurling on the top and bottom faces; the transverse width of the unknurled zone being less than the transverse width of the knurled zone on the top or bottom face.

5,491,015

## SLIP CONTROL SHEETING AND ARTICLES COVERED WITH SAME

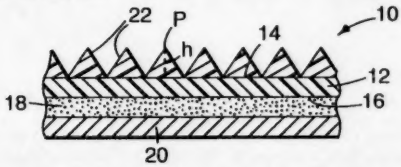
Mark E. Reeves, Maplewood; Margaret A. Hartfel, Minneapolis, both of Minn.; Forrest J. Rouser, San Rafael, Calif.; Kenneth L. Smith, White Bear Lake, and Olester Benson, Jr., Woodbury, both of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Continuation-in-part of Ser. No. 751,147, Aug. 28, 1991, Pat. No. 5,234,740. This application Aug. 13, 1992, Ser. No. 929,685

The portion of the term of this patent subsequent to Aug. 10, 2010, has been disclaimed.

Int. Cl.[6] B32B *3/28;* A63B *49/08;* B25G *1/01;* B62K *21/26*

U.S. Cl. 428—167 28 Claims




1. A slip control sheeting comprising a backing having a first and a second major surface and an array of protrusions on said first major surface, said protrusions being at least one of pyramids with polygonal bases or pyramidal frustums with polygonal bases, the height of said protrusions being between about 75 and about 750 microns, said sheeting further comprising at least one of (1) a layer of adhesive on said second major surface, (2) a reinforcing web, or (3) a mechanical fastening component for fastening said backing to a substrate.

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5,491,016

## BULKABLE POROUS NONWOVEN FABRIC

H. Paul Kaiser, Tuckerton; Ellen Mosley, Ventnor; Samuel C. Baer, Woodbury, and Kenneth Bononcini, Newfield, all of N.J., assignors to FiberTech Group, Inc., Landisville, N.J.

Filed Mar. 15, 1994, Ser. No. 213,609

Int. Cl.[6] B32B *27/14*

U.S. Cl. 428—198 11 Claims

9. A low bulk nonwoven fabric, said fabric being capable of being bulked upon application of heat, said fabric comprising a pair of outer layers of heat bondable thermoplastic staple fibers, an inner layer of thermoplastic fibers comprising heat shrinkable bicomponent fibers in unshrunk condition, and a plurality of spaced thermal point bonds through said layers wherein the heat shrinkable fibers comprises less than 25 percent by weight of the fabric.

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5,491,017

## SHRINK WRAP MATERIAL AND METHOD FOR PROTECTING ARTICLES

Gregory L. Todt, Union, Mich., assignor to Transhield, Inc., Elkhart, Ind.

Filed Oct. 14, 1994, Ser. No. 324,105

Int. Cl.[6] B32B *27/14;* F16B *4/00;* B65D *85/68*

U.S. Cl. 428—198 11 Claims

1. A material for shrink wrapping articles comprising a shrinkable, stretchable film first layer having a predetermined shrink response in response to heat applied to the film and a non-woven fabric second layer having raised and lowered portions, each of said first and second layers having surfaces engaging one another wherein said raised portions of said second layer form a surface of the fabric that bonds to the film surface by an adhesive to form intermittent bonds between the layers, said intermittent bonds being distributed across the engaging surface of the film.

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5,491,018

## LAMINATED PACKAGING MATERIAL

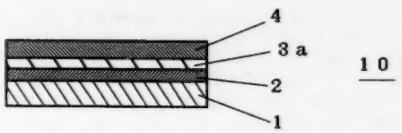
Hideharu Maro; Hideki Kodaira; Hiroshi Iwase, and Yuji Komiya, all of Tokyo, Japan, assignors to Toppan Printing Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 107,759, Aug. 20, 1993, abandoned. This application Mar. 16, 1995, Ser. No. 405,457

Claims priority, application Japan, Dec. 28, 1991, 3-358827; May 7, 1992, 4-143199; May 8, 1992, 4-143603

Int. Cl.[6] B32B *7/12;33/00*

U.S. Cl. 428—200 8 Claims




1. A laminated packaging material, comprising:

a substrate;

a silicon oxide layer formed on the substrate;.

a water-based adhesive layer or a water-based anchor coat layer, formed on the silicon oxide layer; and

a heat-sealable resin layer formed on the adhesive layer or anchor coat layer.

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5,491,019

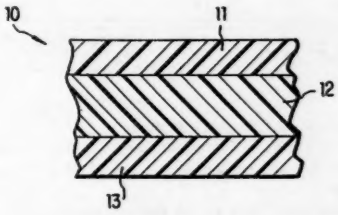
## OXYGEN-PERMEABLE MULTILAYER FILM

Betsy P. Kuo, Greenville, S.C., assignor to W. R. Grace & Co.-Conn., Duncan, S.C.

Filed Mar. 28, 1994, Ser. No. 218,776

Int. Cl.[6] B32B *7/02*

U.S. Cl. 428—213 13 Claims




1. A multilayer film, comprising:

a first layer comprising a first homogeneous ethylene/α-olefin copolymer;

a second layer comprising a polyolefin; and

a third layer comprising a second homogeneous ethylene/α-olefin copolymer;

wherein the second layer is between the first layer and the third layer, the second layer is chemically different from the first layer and the third layer, and the multilayer film has an oxygen transmission rate of from about 500 to 50,000 cc/$m^2$ 24 hr STP.

5,491,020

## MOLDED BOARDS OF CALCIUM SILICATE AND PROCESS FOR PRODUCING THE SAME

Tsutomu Ide, Mie, and Suguru Hamada, Gifu, both of, Japan, assignors to Kabushiki Kaisha Osaka Packing Seizosho, Osaka, Japan

Division of Ser. No. 13,215, Feb. 1, 1993, Pat. No. 5,411,793, which is a continuation of Ser. No. 547,002, Jul. 2, 1990, abandoned, which is a continuation-in-part of Ser. No. 360,928, Feb. 21, 1989, abandoned, and a continuation-in-part of Ser. No. 347,959, Feb. 3, 1989, abandoned. This application Nov. 10, 1994, Ser. No. 338,797

Claims priority, application WIPO, Jun. 12, 1987, PCT/JP87/00383; Japan, Jun. 26, 1987, 62-160280; WIPO, Jun. 24, 1988, PCT/JP88/00630

Int. Cl.[6] B32B *7/02*

U.S. Cl. 428—215 10 Claims

1. A board comprising calcium silicate crystals, composed of a plurality of laminated thin sheets, each of the thin sheets having a thickness of 2 mm or less, and each consisting of secondary particles of calcium silicate crystals, a fibrous material and a coagulant adsorbed on the surface of the secondary particles, said secondary particles of calcium silicate being interconnected with one another, within each of said thin sheets and between adjacent thin sheets thereby firmly uniting said thin sheets to each other into said board as an integral body.

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5,491,021

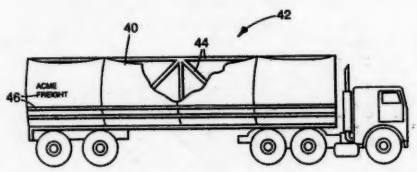
## TRUCK TRAILER COVER HAVING A HIGH STRENGTH NON-CHLORINATED MULTI-LAYERED POLYMERIC ARTICLE

Howard R. Tolliver, and Terry R. Bailey, both of Woodbury, Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Division of Ser. No. 82,037, Jun. 24, 1993. This application May 22, 1995, Ser. No. 447,305

Int. Cl.[6] B60R *13/00*

U.S. Cl. 428—217 20 Claims




1. A truck trailer cover that comprises:

a multi-layered article dimensioned and adapted to be fitted over and secured to a truck trailer, the multi-layered article comprising:

(a) a fabric having first and second sides; and

(b) a first sheet disposed on the first side of the fabric, and a second sheet disposed on the second side of the fabric, the first sheet comprising polymeric layers A and B and the second sheet comprising polymeric layers A' and B', wherein:

polymeric layers A and A' each include a non-chlorinated, copolymer that contains ethylene units and has a Shore A hardness less than 85;

polymeric layers B and B' each include a non-chlorinated polymer having a Shore A hardness greater than 85; and

polymeric layers A and A' are disposed between the fabric and layers B and B', respectively.

5,491,022

## PROTECTIVE FABRICS AND GARMENTS

W. Novis Smith, Philadephia, Pa., assignor to Lakeland Industries, Inc., Ronkonkoma, N.Y.

Filed Sep. 24, 1993, Ser. No. 125,771

Int. Cl.[6] B32B *27/06;27/34;27/32;27/36*

U.S. Cl. 428—224 11 Claims

1. A fire and chemical resistant fabric having anti-static properties which comprises at least one laminate formed by coextruding a pair of polymeric sheets selected from the group consisting of polyolefin, polyester and polyamide with an intermediate layer of a polar resin or hydrophilic polymer selected from the group consisting of ethylene-vinyl alcohol, polyvinyl alcohol, polyvinyl acetate, ionomers and nylon, said laminate being adhered to a fabric scrim comprising a blend of polyester and cellulosic fibers, said fabric scrim containing an effective amount of an antistatic and fire resistant agent.

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5,491,023

## FILM COMPOSITION

Mingliang L. Tsai, East Brunswick, N.J., and Riccardo Balloni, Milano, Italy, assignors to Mobil Oil Corporation, Fairfax, Va.

Filed Jun. 10, 1994, Ser. No. 258,316

Int. Cl.[6] B32B *7/12*

U.S. Cl. 428—349 16 Claims

1. A metallized film composition comprising a polymer substrate having a surface which is modified by an adhesion promoting agent, the modified surface of the polymer substrate having a skin layer of 100% polyvinyl alcohol, the skin layer having a metal layer directly thereon.

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5,491,024

## PHOTODEGRADABLE CELLULOSE ESTER TOW

Terry A. Brodof, Charlotte, and John B. Hopkins, Jr., Pineville, both of N.C., assignors to Hoechst Celanese Corporation, Somerville, N.J.

Filed Mar. 14, 1995, Ser. No. 404,477

Int. Cl.[6] D02G *3/00*

U.S. Cl. 438—1372 4 Claims

1. A man-made fiber comprising a mixture of:

a cellulose ester; and

about 0.05 to 5.0% by weight of titanium dioxide having an average particle size of less than 100 nanometers.

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5,491,025

## ABRASIVE FILAMENTS COMPRISING ABRASIVE-FILLED THERMOPLASTIC ELASTOMER

Richard M. Pihl, Cottage Grove, Minn.; Duane J. Hayes, Ellsworth, Wis.; Loren L. Barber, Jr., Lake Elmo, Minn.; Dennis G. Welygan, Woodbury, Minn.; R. Eugene Hardwick, Maplewood, Minn., and Ronald O. Zemke, deceased, late of White Bear Lake, Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Division of Ser. No. 351,884, Dec. 8, 1994, Pat. No. 5,443,906, which is a continuation of Ser. No. 65,864, May 21, 1993, abandoned, which is a continuation of Ser. No. 854,330, Mar. 19, 1992, abandoned. This application May 15, 1995, Ser. No. 440,749

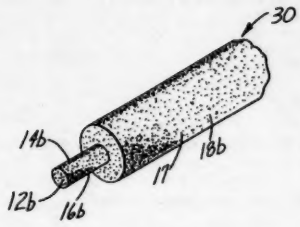
Int. Cl.[6] D07G *3/00*

U.S. Cl. 428—373 21 Claims

16. An abrasive filament comprising:

(a) a core having a continuous surface throughout its length and consisting essentially of a first thermoplastic elastomer, the first thermoplastic elastomer having abrasive particles dispersed and adhered therein; and

(b) a sheath coterminous with the core, the sheath consisting essentially of a blend of a second thermoplastic elastomer and




a thermoplastic polymer, the blend in melt fusion adherent contact with the core along the continuous surface.

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**5,491,026**

## PROCESS FOR TREATING FIBERS WITH AN ANTISTATIC FINISH

**Elbert H. Mudge, Charlotte, and Charles G. DeWitt, Matthews, both of N.C., assignors to Henkel Corporation, Plymouth Meeting, Pa.**

**Continuation of Ser. No. 119,084, Nov. 16, 1993. This application Apr. 28, 1995, Ser. No. 430,702**

**Claims priority, application WIPO, Sep. 16, 1992, PCT/US92/07655**

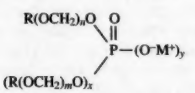
**Int. Cl.[6] B05D** *3/02*

**U.S. Cl. 428—395** **14 Claims**

1. Synthetic fibers containing an antistatic finish applied thereto by the process comprising the steps of

I) applying to the synthetic fibers a composition comprising

a) at least one salt of a phosphate partial ester of the formula




(I)

wherein

R is the dodecyl group,

$M^+$ is an alkali metal cation, a mono—, di—, or tri-alkyl amine cation, or a mono—, di— or trialkanolamine cation,

n and m are each independently an integer of from 0 to 6,

x is 0 or 1, and

y is 2 when x is 0 and 1 when x is 1;

except that the partial ester salt of formula I cannot be potassium lauryl phosphate:

b) at least one anionic and/or cationic emulsifier; and

c) at least one lubricant; and

II) autoclaving the fibers from step I at a temperature in the range of from about 93° C. to about 150° C.

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**5,491,027**

## MELT-PROCESSIBLE CONDUCTING POLYMER BLENDS BASED ON FIBRILS OF INTRACTABLE CONDUCTING POYMERS

**Alan J. Heeger, and Paul Smith, both of Santa Barbara, Calif., assignors to Uniax Corporation, Santa Barbara, Calif.**

**Division of Ser. No. 99,629, Jul. 30, 1993, Pat. No. 5,427,855, which is a division of Ser. No. 697,316, May 6, 1991, Pat. No. 5,246,627. This application Apr. 24, 1995, Ser. No. 427,562**

**Int. Cl.[6] C08L** *79/04*

**U.S. Cl. 428—401** **4 Claims**

1. A melt processible electrically conductive polymer admixture comprising from 0.1 to 99.9 parts by weight of elongate fine fibrils comprising electrically conductive conjugated polymer, said fibrils having an aspect ratio of greater than 5 and a diameter of less than 200 μm, and from 99.9 to 0.1 parts by weight of melt processible insulating polymer.

**5,491,028**

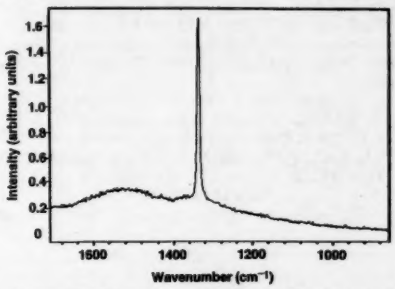
## ENHANCED ADHERENCE OF DIAMOND COATINGS

**Vinod K. Sarin, Lexington, and Shish P. S. Arya, Allston, both of Mass., assignors to Trustees of Boston University, Boston, Mass.**

**Division of Ser. No. 64,556, May 21, 1993, Pat. No. 5,433,977. This application Apr. 18, 1995, Ser. No. 423,998**

**Int. Cl.[6] C23C** *16/26*

**U.S. Cl. 428—408** **19 Claims**




1. A crystalline diamond coated substrate wherein a coating is deposited on the substrate by establishing a flow of oxygen and acetylene to a combustion device at a volumetric flow ratio ($R=O_2/C_2H_2$) of greater than or equal to about 1.0; creating a flame in the combustion device, wherein the flame comprises an inner core region, an acetylene feather region, and an outer region; positioning the substrate, which is maintained at a temperature of between about 300° C. to about 1200° C., in the acetylene feather region; adding to the flame a deposition promoter to favor the growth of a strongly adherent, uniform layer of crystalline diamond particles on the substrate, wherein the deposition promoter is selected from the group consisting of carboxylic acids, alcohols, aldehydes, ketones, ethers and carboxylic acid esters; and depositing the strongly adherent, uniform layer of crystalline diamond particles of substantially uniform size and shape on the substrate.

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**5,491,029**

## MAGNETIC RECORDING MEDIUM HAVING A BINDER COMPOSITION COMPRISING PHOSPHONATED POLYURETHANE AND A VINYL CHLORIDE COPOLYMER WITH AMMONIUM FUNCTIONALITIES

**Christopher M. Evans, Harlow, and Colin F. Norman, Bishops Stortford, both of, Great Britain, assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.**

**Filed Sep. 16, 1994, Ser. No. 306,992**

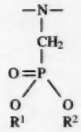
**Claims priority, application Great Britain, Jan. 7, 1993, 9320711**

**Int. Cl.[6] G11B** *5/00*

**U.S. Cl. 428—423.1** **17 Claims**

1. A magnetic recording medium comprising a substrate bearing a binder composition having magnetic pigment dispersed therein wherein said binder composition comprises:

(i) a phosphonated polyurethane having a plurality of units of the formula:




wherein:

the nitrogen atom forms part of the backbone chain of the polymer, and

$R^1$ and $R^2$ independently represent members selected from the group consisting of alkyl groups of 1 to 5 carbon atoms,

cycloalkyl groups and aryl groups of 6 to 10 carbon atoms or together $R^1$ and $R^2$ comprise the necessary carbon atoms to complete a ring, and

(ii) a vinyl chloride copolymer having pendant ammonium functionalities.

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**5,491,030**

**SURFACE FINISHING FOR METAL MOLDINGS**

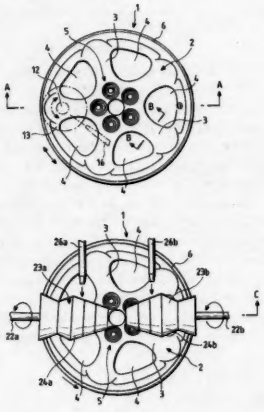
**Shigesaburo Asai, and Tetsuya Sakagami, both of Shizuoka, Japan, assignors to Asahi TEC Corporation, Shizuoka, Japan**

**Filed Jun. 28, 1993, Ser. No. 82,295**

**Claims priority, application Japan, Jun. 26, 1992, 4-169234; Jun. 26, 1992, 4-169235; Jun. 26, 1992, 4-169236; Jun. 26, 1992, 4-169237; Sep. 4, 1992, 4-236838; Sep. 18, 1992, 4-248417; Sep. 30, 1992, 4-261252**

**Int. Cl.[6] B32B** *9/00*

**U.S. Cl. 428—433** **3 Claims**



1. An aluminum alloy article which is to be provided with a mirror-finish, characterized in that a mean value of dendrite secondary arm spacing in a surface region of said article is not greater than about 40μm.

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**5,491,031**

**COATING COMPOSITION FOR METAL SUBSTRATES**

**Lawrence P. Seibel, Kenosha, Wis., assignor to The Dexter Corporation, Windsor Locks, Conn.**

**Filed Nov. 14, 1994, Ser. No. 340,046**

**Int. Cl.[6] C08L** *61/14;61/10*

**U.S. Cl. 428—458** **25 Claims**

1. A coating composition for application to a primed metal substrate comprising:

(a) about 13% to about 30%, by weight of nonvolatile material, of an epoxy novolac resin having an epoxy functionality of about 2 to about 6 and an epoxy equivalent weight of about 100 to about 210;

(b) about 40% to about 60%, by weight of nonvolatile material, of a phenolic resin;

(c) about 15% to about 30%, by weight of nonvolatile material, of a polyester having a weight average molecular weight of about 1,000 to about 50,000;

(d) about 5% to about 20%, by weight of nonvolatile material, of an elastomer; and

(e) a nonaqueous carrier;

wherein the composition has a ratio of epoxy novolac resin to phenolic resin of about 25:75 to about 33:66 and a ratio of elastomer to polyester of about 1:1 to about 1:2; and

wherein the composition is free of a halide-containing vinyl polymer.

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**5,491,032**

**MASKING FILM**

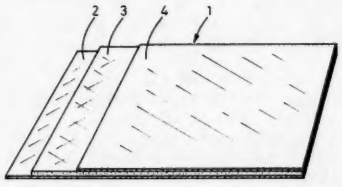
**Patrick C. M. Verschaeren, Brecht, Belgium, assignor to Hyplast N.V., Hoogstraten, Belgium**

**Filed Feb. 16, 1994, Ser. No. 197,160**

**Claims priority, application Netherlands, Feb. 23, 1993, 9300330**

**Int. Cl.[6] B32B** *15/00*

**U.S. Cl. 428—461** **5 Claims**



1. A masking film to use when lacquering surface parts, which consists of a multilayer foil having a polar outer layer consisting of a permanently polar ionomer resin acid copolymer or terpolymer free of any pre- or post treatment.

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**5,491,033**

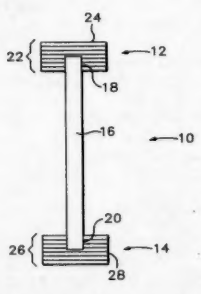
**WOOD VENEERS AND PRODUCTS THEREFROM HAVING ENHANCED STRENGTH AND STIFFNESS**

**David W. Park, Puyallup; Frank R. Hunter, Bellevue, and Alkiviadis G. Dimakis, Federal Way, all of Wash., assignors to Weyerhaeuser Company, Tacoma, Wash.**

**Filed Aug. 15, 1994, Ser. No. 290,347**

**Int. Cl.[6] B32B** *9/00*

**U.S. Cl. 428—537.1** **43 Claims**



1. A wood product enhanced in stiffness, the wood product comprising:

a wood veneer having a length dimension, a width dimension, and a thickness dimension, the veneer being treated so as to have a population of compacted wood cells, the population of compacted wood cells extending across at least a portion of the length and width dimensions and into the thickness dimension of the treated veneer so as to confer an increased density on, and thus a correspondingly increased stiffness to, the treated veneer compared to an otherwise similar but not treated control veneer, the treated veneer including a loading level of a cured rigid thermoset material interspersed throughout the population of compacted wood cells, the loading level being sufficient to maintain compaction of said cells without saturating the compacted cells with the thermoset material,

thereby conferring on the treated veneer an increased density and stiffness relative to the control veneer.

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**5,491,034**

## BONDING WIRE FOR SEMICONDUCTOR ELEMENT

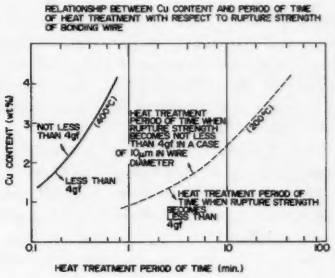
**Yasuhide Ohno, and Yoshio Ohzeki, both of Tokyo, Japan, assignors to Nippon Steel Corporation, Japan**

**Continuation of Ser. No. 13,665, Jan. 28, 1993, abandoned, which is a continuation of Ser. No. 457,772, Jan. 2, 1990, abandoned. This application Nov. 18, 1994, Ser. No. 345,351**

**Claims priority, application Japan, May 2, 1988, 63-109587**

**Int. Cl.[6] C22C** *5/02;* **H01L** *21/60*

**U.S. Cl. 428—606** **12 Claims**


RELATIONSHIP BETWEEN Cu CONTENT AND PERIOD OF TIME OF HEAT TREATMENT WITH RESPECT TO RUPTURE STRENGTH OF BONDING WIRE
Cu CONTENT (wt%)
HEAT TREATMENT PERIOD OF TIME (min.)
NOT LESS THAN 4gf
(ABOVE)
LESS THAN 4gf
HEAT TREATMENT PERIOD OF TIME WHEN RUPTURE STRENGTH BECOMES NOT LESS THAN 4gf IN A CASE OF 10μm IN WIRE DIAMETER
HEAT TREATMENT PERIOD OF TIME WHEN RUPTURE STRENGTH BECOMES LESS THAN 4gf
(ABOVE)
0.1
1
10
100
1
2
3
4

1. A bonding wire for a semiconductor element, consisting of Cu of not less than 1 weight % but less than 5 weight %, at least one member selected from the group consisting of Ca, Ge, Be, La and In in an amount of 0.0003 to 0.01 weight % in total, and the balance Au, and having a purity of at least 99.9%, and wherein the diameter of the wire is not greater than 15 μm and having a rupture strength not less than 4 grams.

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**5,491,035**

## COATED METAL STRIP

**Jay F. Carey, II, Follansbee, W. Va., and Mehrooz Zamanzadeh, Pittsburgh, Pa., assignors to The Louis Berkman Company, Steubenville, Ohio**

**Continuation-in-part of Ser. No. 175,523, Dec. 30, 1993, Pat. No. 5,401,586, which is a continuation-in-part of Ser. No. 154,376, Nov. 17, 1993, abandoned, which is a continuation of Ser. No. 42,649, Apr. 5, 1993, abandoned. This application Nov. 30, 1994, Ser. No. 347,261**

**Int. Cl.[6] B32B** *15/18;15/20*

**U.S. Cl. 428—647** **79 Claims**

1. A coated metal strip including a base metal strip selected from the group consisting of carbon steel, stainless steel and copper, said base metal strip having parallel surfaces both of which are coated in a continuous, hot-dip process by continuously passing the continuous base metal strip through a bath of molten tin-zinc alloy at an essentially constant speed to deposit onto said base strip an impervious low reflecting, corrosive-resistant, two-phase layer of said tin-zinc alloy, said two-phase tin-zinc layer comprising tin, at least about 20 weight percent zinc and an effective amount of a metal stabilizer selected from the group consisting of copper, antimony, bismuth and mixtures thereof, said two-phase tin-zinc layer having a tin plus a zinc content at least 75 weight percent of said layer.

**5,491,036**

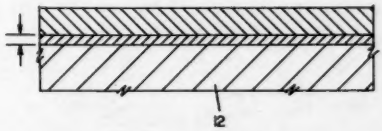
## COATED STRIP

**Jay F. Carey, II, Follansbee, W. Va., and Mehrooz Zamanzadeh, Pittsburgh, Pa., assignors to The Louis Berkman Company, Steubenville, Ohio**

**Continuation-in-part of Ser. No. 175,523, Dec. 30, 1993, Pat. No. 5,401,586, and a continuation-in-part of Ser. No. 165,085, Dec. 10, 1993, Pat. No. 5,397,652, and a continuation-in-part of Ser. No. 380,372, Jan. 30, 1995, which is a continuation of Ser. No. 153,026, Nov. 17, 1993, Pat. No. 5,395,703, which is a division of Ser. No. 858,662, Mar. 27, 1992, abandoned, said Ser. No. 175,523is a continuation-in-part of Ser. No. 154,376, Nov. 17, 1993, abandoned, which is a continuation of Ser. No. 42,649, Apr. 5, 1993, abandoned, said Ser. No. 165,085is a continuation-in-part of Ser. No. 101, Jan. 4, 1993, abandoned, which is a continuation-in-part of Ser. No. 858,662, Jan. 4, 0. This application Mar. 13, 1995, Ser. No. 402,925**

**Int. Cl.[6] B32B** *15/18;15/20*

**U.S. Cl. 428—647** **38 Claims**




1. A thin metal strip of a metal selected from the group consisting of carbon steel, stainless steel, copper, nickel alloys, tin, titanium, coated in a continuous, hot-dip process having an ultra-thin intermediate metal layer of a metal selected from the group consisting of nickel, chromium, zinc, copper or tin applied to the surface of said strip and a coating of corrosive-resistant metallic coating coated onto said intermediate metal barrier layer, said coating comprising at least about 15 weight percent tin, at least about 10 weight percent zinc, less than 1.0 weight percent lead and an effective amount of metallic stabilizer selected from the group consisting of antimony, bismuth, copper and mixtures thereof.

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**5,491,037**

## METHOD FOR RECOVERING LITHIUM CELL MATERIALS

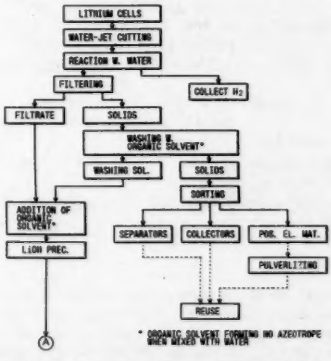
**Soichiro Kawakami, Nara, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan**

**Filed Feb. 24, 1994, Ser. No. 200,468**

**Claims priority, application Japan, Feb. 25, 1993, 5-036589**

**Int. Cl.[6] H01M** *10/54*

**U.S. Cl. 429—49** **11 Claims**




1. A method for recovering lithium cell materials, comprising the steps of:

opening a lithium cell in an opening means for preventing ignition and for substantially intercepting oxygen;

washing the lithium cell thus opened, with an organic solvent to recover an electrolytic solution thereof;

reacting lithium in the lithium cell with a reacting agent to recover lithium in the form of lithium hydroxide or a lithium salt;

carrying out filtration to recover solid materials of the lithium cell;

and carrying out distillation to recover the organic solvent.

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**5,491,038**

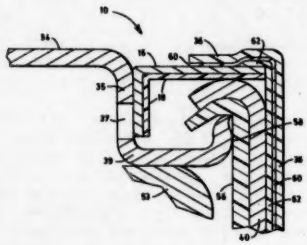
**CONTACT RING FOR ON-CELL BATTERY TESTER**

**Christopher L. DePalma, Framingham; William T. McHugh, Westwood; Sean A. Sargeant, Westford; Marian Wiacek, Holliston, all of Mass., and Robert A. Yoppolo, Woonsocket, R.I., assignors to Duracell Inc., Bethel, Conn.**

**Filed Aug. 24, 1994, Ser. No. 295,314**

**Int. Cl.[6] H01M** *10/48*

**U.S. Cl. 429—91** **21 Claims**



**1.** An electrochemical cell having a positive and a negative terminal, an on-cell tester for visually indicating the condition of the cell, said tester having at least one lead, and an electrically conductive contact ring for making an electrical connection between said lead and one of said terminals on which said ring is mounted and electrically connected to, said ring having a flange disposed adjacent said other terminal, with electrical insulating means disposed between said ring and other terminal to prevent an electrical connection therebetween, and with said tester lead disposed adjacent said flange for making electrical contact thereto.

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**5,491,039**

**SOLID ELECTROLYTES INCLUDING ORGANOMETALLIC ION SALTS AND ELECTROLYTIC CELLS PRODUCED THEREFROM**

**Dale R. Shackle, 17135 Oak Leaf Dr., Morgan Hill, Calif. 95037**

**Filed Feb. 4, 1994, Ser. No. 192,392**

**Int. Cl.[6] H01M** *6/18*

**U.S. Cl. 429—192** **32 Claims**

**1.** A solid, single-phase electrolyte which comprises:

a solid polymeric matrix; and

an ionically conducting amount of an organometallic ion salt having the formula:

$$M_c(AR_n)$$

where M is a metal ion selected from the group consisting of Li, Na, K and Mg; A is a metal ion selected from the group consisting of Al and Ti; R is selected from the group consisting of an alkyl group having from 1 to 6 carbon atoms, a mono or dialkyl amine having from 1 to 8 carbon atoms, and a cyclic or linear ether having the formula $O(R_1O)_p$ where $R_1$ is an alkyl group having from 1 to 6 carbon atoms, c is 1 or 2 and n is an interger from 1 to 6 and p is from 1 to 4.

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**5,491,040**

**DUAL PURPOSE LITHIUM SALT FOR ELECTROCHEMICAL CELLS**

**Benjamin Chaloner-Gill, 520 Mansion Ct., #303, Santa Clara, Calif. 95054**

**Continuation-in-part of Ser. No. 73,910, Jun. 8, 1993, Pat. No. 5,411,820. This application Mar. 31, 1995, Ser. No. 414,874**

**Int. Cl.[6] H01M** *6/18*

**U.S. Cl. 429—192** **19 Claims**

**1.** A solid, single-phase, solvent-containing electrolyte which comprises:

a solid polymeric matrix; and

a solvent comprising an ionically conducting amount of an alkali metal poly(oxyalkylene) sulfonate having the formula:

$$RSO_2O(R^1O)_pM$$

where R is selected from the group consisting of alkyl and perfluoroalkyl of from 1 to 6 carbon atoms, phenyl, alkphenyl of from 7 to 12 carbon atoms, and phenyl substituted with 1 to 3 substituents selected from the group consisting of alkyl of from 1 to 4 carbon atoms, alkoxy of from 1 to 4 carbon atoms, fluoro, chloro and bromo;

$R^1$ is $(CR^3R^4)_q$ where $R^3$ and $R^4$ are independently selected from the group consisting of hydrogen and alkyl of from 1 to 4 carbon atoms, q is an integer from 1 to 6, and wherein when q is greater than 1, the $R^3$ and $R^4$ on each carbon atom may be the same or different;

M is a metal ion selected from the group consisting lithium, sodium, and potassium ions; and

p is an integer of from 2 to 6.

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**5,491,041**

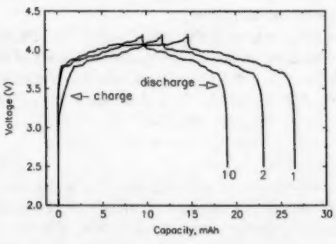
**SOLID-STATE SECONDARY BATTERIES WITH GRAPHITE ANODES**

**Kuzhikalail M. Abraham, Needham; Mohamed Alamgir, Dedham, and Zhiping Jiang, Sharon, all of Mass., assignors to EIC Laboratories, Inc., Norwood, Mass.**

**Filed Oct. 14, 1994, Ser. No. 323,180**

**Int. Cl.[6] H01M** *4/60*

**U.S. Cl. 429—212** **5 Claims**




**1.** A solid state rechargeable electrochemical cell comprising a Li intercalating composite cathode, a solid polymer electrolyte separator composed of a polymer network, a Li salt, and a plasticizer of propylene carbonate or a mixture of propylene carbonate and one or more other solvents, and a composite anode containing graphite as the Li intercalating active material, a polymer electrolyte of the same composition as that in the separator, and 12-crown-4-ether in a weight ratio of 0.05 to 0.21 to graphite.

**5,491,042**

## METHOD FOR MANUFACTURING A RESIN-COATED CARRIER FOR AN ELECTROPHOTOGRAPHIC DEVELOPER

**Yuji Sato; Toshiyuki Fukumoto; Yoshifumi Imamura, and Toshio Honjo, all of Kashiwa, Japan, assignors to Powdertech Co., Ltd., Kashiwa, Japan**

**Continuation-in-part of Ser. No. 13,683, Feb. 4, 1993, abandoned. This application Jul. 29, 1994, Ser. No. 283,249**

**Claims priority, application Japan, Feb. 7, 1992, 4-056730**

**Int. Cl.[6] G03G** *9/113*

**U.S. Cl. 430—108** **12 Claims**

1. A method of manufacturing a resin-coated carrier for an electrophotographic developer comprising the steps of

1) coating a resin on the surface of a carrier core, each of said resin and said carrier core being a dielectric material, to obtain a resin coated carrier;

2) baking the thus obtained resin-coated carrier by means of microwave heating with a microwave, said microwave having an agitating blade, under such conditions that the thickness of the resin-coated carrier layer being baked is in the range of from 5 to 25 mm, the number of revolutions of said agitating blade for agitating the microwave is in the range of from 20 to 40 rpm and the irradiation time is in the range of from 30 seconds to 10 minutes, to obtain the resin-coated carrier.

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**5,491,043**

## ELECTROSTATIC TONERS WITH POLYAMINE CHARGE STABILIZERS

**Johannes P. Dix, Weisenheim; Ulf Baus, Dossenheim; Karin H. Beck, and Friedrich-Wilhelm Raulfs, both of Ludwigshafen, all of, Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Germany**

**Filed May 18, 1994, Ser. No. 245,559**

**Claims priority, application Germany, May 21, 1993, 43 17 059.5**

**Int. Cl.[6] G03G** *9/097*

**U.S. Cl. 430—110** **11 Claims**

1. An electrostatic toner, comprising:

a) a polymeric binder; and

b) a charge stabilizer, wherein said charge stabilizer is a polyamine having an average molecular weight of 150–15,000, said polyamine having at least three nitrogen atoms wherein adjacent nitrogen atoms are separated from each other by a first radical selected from the group consisting of $C_1$-$C_{13}$-alkylene and phenyl-substituted $C_1$-$C_{13}$-alkylene, said nitrogen atoms being substituted by a second radical selected from the group consisting of $C_1$-$C_{13}$-alkyl, phenyl-substituted $C_1$-$C_{13}$-alkyl, hydroxyl-substituted-$C_1$-$C_{13}$-alkyl, carboxyl-substituted $C_1$-$C_{13}$-alkyl, phenyl, $C_1$-$C_{10}$-alkanoyl, benzoyl, $C_1$-$C_6$-alkylcarbamoyl and phenylcarbamoyl, and said adjacent nitrogen atoms are bonded together by said first radical or nitrogen atoms on two of said polyamines are bonded together through a third radical of the formula CO-L-CO, where L is $C_2$-$C_8$-alkylene.

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**5,491,044**

## TONERS AND DEVLOPERS CONTAINING QUATERNARY AMMONIUM 3,5-DI-TERTIARY-ALKYL-4-HYDROXYBEZENESULFONATE SALTS AS CHARGE-CONTROL AGENTS

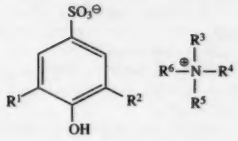
**John C. Wilson, Rochester, and Dinesh Tyagi, Fairport, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.**

**Filed Dec. 21, 1994, Ser. No. 361,347**

**Int. Cl.[6] G03G** *9/097*

**U.S. Cl. 430—110** **11 Claims**

1. A dry, particulate electrostatographic toner composition comprising a polymeric binder and a charge-control agent comprising a quaternary ammonium salt having the structure:



wherein

$R^1$ and $R^2$ are tertiary-alkyl containing from 4 to 8 carbon atoms; $R^3$, $R^4$, $R^5$ and $R^6$ are the same or different and are independently selected from an unsubstituted alkyl group having from 1 to 24 carbon atoms; a substituted alkyl group having from 1 to 24 carbon atoms substituted with one or more hydroxy-, carboxy-, alkoxy-, carboalkoxy-, acyloxy-, nitro-, cyano-, keto- or halo-groups; a cycloalkyl group having from 3 to 7 carbon atoms; an unsubstituted aryl group having from 6 to 14 carbon atoms; a substituted aryl group having from 6 to 14 carbon atoms substituted with one or more hydroxy-, carboxy-, alkoxy-, carboalkoxy-, acyloxy-, amino-, nitro-, cyano-, keto- or halo-groups; an alkaryl group having from 1 to 20 carbon atoms in the alkyl group and 6 to 14 carbon atoms in the aryl group; an aralkyl group having from 1 to 4 carbon atoms in the alkyl group and 6 to 14 carbon atoms in the aryl group wherein the aryl group is unsubstituted or substituted with one or more alkyl-, hydroxy-, carboxy-, alkoxy-, carboalkoxy-, acyloxy-, amino-, nitro-, cyano-, keto- or halo- groups; or wherein any two or more of $R^3$, $R^4$, $R^5$ or $R^6$ can be interconnected to one another to form a 5 to 14 membered saturated or unsaturated ring system.

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**5,491,045**

## IMAGE DYE COMBINATION FOR LASER ABLATIVE RECORDING ELEMENT

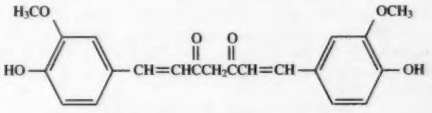
**Charles D. DeBoer, Rochester; Richard P. Henzel, Webster; Stephen M. Neumann, Rochester, and Lee W. Tutt, Webster, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.**

**Filed Dec. 16, 1994, Ser. No. 356,986**

**Int. Cl.[6] G03C** *5/16*

**U.S. Cl. 430—200** **10 Claims**

1. A laser dye-ablative recording element comprising a support having thereon a dye layer comprising two or more image dyes dispersed in a polymeric binder, said dye layer having an infrared-absorbing material associated therewith, and wherein said image dyes comprise a curcumin yellow dye having the formula:



and a 1,4-diamino anthraquinone dye.

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**5,491,046**

## METHOD OF IMAGING A LITHOGRAPHIC PRINTING PLATE

**Charles D. DeBoer, Rochester, and Neil F. Haley, Wellington, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.**

**Filed Feb. 10, 1995, Ser. No. 386,839**

**Int. Cl.[6] G03F** *7/038;7/20;7/30;7/38*

**U.S. Cl. 430—302** **20 Claims**

1. A method of imaging a lithographic printing plate; said method comprising the steps of:

(I) providing a lithographic printing plate comprising a support and an imaging layer that is sensitive to both ultraviolet and infrared radiation and capable of functioning in either a positive-working or negative-working manner; said imaging layer comprising an admixture of (1) a resole resin, (2) a novolac resin, (3) a latent Bronsted acid and (4) an infrared absorber; and

(II) imagewise exposing said imaging layer with a high-intensity laser diode emitting an infrared laser beam with an intensity at the surface of said imaging layer of at least about 0.2 milliwatts per square micrometer.

**19**. A method of imaging a lithographic printing plate; said method comprising the steps of:

(I) providing a lithographic printing plate comprising a support and an imaging layer that is sensitive to both ultraviolet and infrared radiation and capable of functioning in either a positive-working or negative-working manner; said imaging layer comprising an admixture of (1) a resole resin, (2) a novolac resin, (3) a latent Bronsted acid and (4) an infrared absorber;

(II) imagewise exposing said imaging layer with a high-intensity laser diode emitting an infrared laser beam with an intensity at the surface of said imaging layer of at least about 0.2 milliwatts per square micrometer; and

(III) contacting said lithographic printing plate with an aqueous alkaline developing solution to remove the exposed areas thereof and thereby form a lithographic printing surface.

**20**. A method of imaging a lithographic printing plate; said method comprising the steps of:

(I) providing a lithographic printing plate comprising a support and an imaging layer that is sensitive to both ultraviolet and infrared radiation and capable of functioning in either a positive-working or negative-working manner; said imaging layer comprising an admixture of (1) a resole resin, (2) a novolac resin, (3) a latent Bronsted acid and (4) an infrared absorber;

(II) imagewise exposing said imaging layer with a high-intensity laser diode emitting an infrared laser beam with an intensity at the surface of said imaging layer of at least about 0.2 milliwatts per square micrometer;

(III) heating said lithographic printing plate to provide reduced solubility in exposed areas and increased solubility in unexposed areas; and

(IV) contacting said lithographic printing plate with an aqueous alkaline developing solution to remove the unexposed areas thereof and thereby form a lithographic printing surface.

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**5,491,047**

## METHOD OF REMOVING A SILYLATED OR GERMANIUM IMPLANTED PHOTORESIST

**Hyeong Soo Kim, Sungkwang Bidulgi Apt. 2-302, Shinha-Ri, Bubal-Uep, Ichon-Gun, and Tai Kiyung Won, 657-70 Myungmok 7-dong, Chungrang-Gu, Seoul, both of, Rep. of Korea**

**Filed Jun. 3, 1994, Ser. No. 254,005**

**Claims priority, application Rep. of Korea, Jun. 3, 1993, 96-9938**

**Int. Cl.[6] G03F** *7/42*

**U.S. Cl. 430—329** **6 Claims**

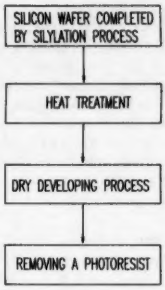
**1**. A method of removing a silylated photoresist comprising the steps of:

heat treating said photoresist using a pre-silylation bake chamber to out-diffuse the silicon contained within said silylated photoresist; and

removing said photoresist in its entirety by a dry developing process using oxygen plasma.

**4**. A method of removing a germanium implanted photoresist comprising the steps of:

heat treating said photoresist using a pre-silylation bake chamber to out-diffuse the germanium contained within said germanium implanted photoresist; and




removing said photoresist in its entirety by a dry developing process using oxygen plasma.

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**5,491,048**

## REMOVAL OF TIN FROM SEASONED PHOTOGRAPHIC COLOR DEVELOPERS

**Ernest R. Anderson, Rochester, and Stephen N. Lowery, Fairport, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.**

**Filed Feb. 21, 1995, Ser. No. 391,737**

**Int. Cl.[6] G03C** *5/31*

**U.S. Cl. 430—347** **8 Claims**

**1**. A process for removing tin from seasoned photographic color developers containing tin as stannous or stannate complex ions, comprising the steps of:

(a) collecting seasoned photographic color developer containing tin;

(b) treating the collected developer with a resin having a chelating group selected from the group consisting of diphosphonic acid, amidoxime and thiol, thereby removing tin from the seasoned photographic color developers.

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**5,491,049**

## PHOTOGRAPHIC COLOUR COUPLERS, METHODS OF MAKING THEM AND PHOTOGRAPHIC MATERIALS CONTAINING THEM

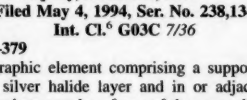
**Philip A. Allway, Watford, United Kingdom, assignor to Eastman Kodak Company, Rochester, N.Y.**

**Filed May 4, 1994, Ser. No. 238,134**

**Int. Cl.[6] G03C** *7/36*

**U.S. Cl. 430—379** **9 Claims**

**1**. A photographic element comprising a support, at least one photosensitive silver halide layer and in or adjacent said silver halide layer a colour coupler of one of the general formulas:




wherein

$R^1$ is a substituted or unsubstituted aryl or a substituted or unsubstituted heterocylic group,

$R^2$ is a saturated or unsaturated, primary or secondary alkyl group in which the carbon atom which joins $R^2$ to the rest of the coupler has at least one fluorine atom attached to it,

$R^3$ is an electron-withdrawing group, and

X is H or a coupling-off group, and wherein the electron-withdrawing properties of $R^1$ are such that the dye formed on coupling with oxidised colour developing agent 4-(N-ethyl-N-2-hydroxyethyl)-2-methylphenylenediamine has a $\lambda_{max}$ of from 537 to 570 nm.

8. A process for forming an image in an element as described in claim 1 after said element has been exposed to light comprising contacting said element with a color developing agent.

9. The process of claim 8 wherein said exposed element is subjected to a reversal color development process.

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5,491,050

## METHOD OF PROCESSING ORIGINATING PHOTOGRAPHIC ELEMENTS CONTAINING TABULAR SILVER CHLORIDE GRAINS BOUNDED BY (100) FACES

**Thomas B. Brust, Webster; Sharon Gould, Rochester; James E. Sutton, Rochester, and Richard P. Szajewski, Rochester, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.**

**Continuation-in-part of Ser. No. 35,347, Mar. 22, 1993, Pat. No. 5,443,943. This application Feb. 9, 1994, Ser. No. 193,831**

**Int. Cl.[6] G03C** *7/46;1/005;1/494;1/46*

**U.S. Cl. 430—380** **20 Claims**

1. A method of processing an exposed silver halide color photographic element comprising developing the photographic element in a color developer solution containing a p-phenylenediamine color developing agent in the presence of a 1-phenyl pyrazolidin-3-one compound;

wherein the silver halide photographic element comprises a radiation sensitive emulsion in reactive association with a development inhibitor releasing compound and containing a silver halide grain population comprised of grains comprising at least 50 mole percent silver chloride, based on total silver forming the grain population projected area, wherein at least 50 percent of total grain projected area is accounted for by silver halide tabular grains

(1) bounded by {100} major faces having adjacent edge ratios of less than 10 and

(2) having an average aspect ratio of at least 2; and

wherein the silver halide content of the photographic element comprises at least 50 mole % silver chloride and no more than 2 mole % silver iodide.

5,491,051

## PHOTOGRAPHIC ELEMENT

**John F. DeCory; Robert O. James; Kenneth L. Tingler, and Ronald M. Wexler, all of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.**

**Continuation of Ser. No. 193,686, Feb. 8, 1994, abandoned, which is a continuation-in-part of Ser. No. 171,785, Dec. 22, 1993, abandoned. This application Feb. 23, 1995, Ser. No. 393,523**

**Int. Cl.[6] G03K** *1/76;* **G11B** *5/708*

**U.S. Cl. 430—496** **37 Claims**

1. A photographic element comprising a support having provided thereon a light-sensitive layer and a transparent magnetic recording layer, the magnetic recording layer comprising a transparent polymeric binder, ferro-magnetic particles and abrasive particles, the abrasive particles being present in the transparent magnetic recording layer in an amount of from about 1 to about 20 percent by weight based on the weight of the binder, the magnetic particles having a surface area greater than 30 $m^2$/gm and a coverage of from about $1\times10^{-11}$ mg/μm$^3$ to about $1\times10^{-10}$ mg/μm$^3$ and being present in the transparent magnetic recording layer in an amount of from about 1 to about 10 percent by weight based on the weight of the binder, the abrasive particles having a median diameter of from about 0.2 to about 0.4 μm, specific surface area greater than 5 $m^2$/gm, a Mohs hardness of at least 6 and being present in the transparent magnetic layer in an amount of at least about 30% by weight based on the weight of the magnetic particles present.

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5,491,052

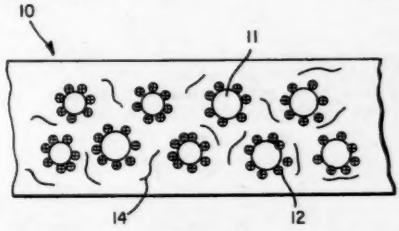
## YELLOW LAYER FOR COLOR PHOTOGRAPHIC ELEMENTS

**James P. Van Meter, Rochester; Pranab Bagchi, Webster; Brian Thomas, Pittsford, and Thomas A. Rosiek, Honeoye Falls, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.**

**Division of Ser. No. 148,125, Nov. 5, 1993, which is a continuation-in-part of Ser. No. 850,722, Mar. 13, 1992, abandoned. This application Jun. 7, 1995, Ser. No. 477,723**

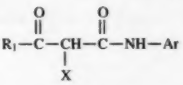
**Int. Cl.[6] G03C** *7/388;7/396*

**U.S. Cl. 430—545** **4 Claims**




1. A method of preparing a blue sensitive layer in a silver halide photographic light sensitive element, which method comprises:

(i) forming a dispersion comprising dispersed particles in an aqueous medium containing a hydrophilic colloid, the particles having a particle size of 0.1 to 0.6 μm and comprising a yellow image-dye forming coupler having the formula:



wherein $R_1$ is substituted or unsubstituted alkyl, substituted or unsubstituted aryl, substituted or unsubstituted anilino or substituted or unsubstituted heterocyclic; Ar is substituted or unsubstituted aryl; and X is hydrogen or a coupling-off group;

(ii) adding a polyoxyalkylene polymer to the dispersion formed in step (i) in an amount of about 0.1 to about 0.6 gram, per gram of the yellow coupler in the dispersion;

(iii) mixing the dispersion with a silver halide emulsion; and
(iv) applying the resulting composition formed in step (iii) onto a support to form a layer.

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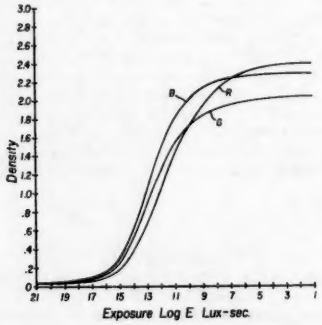
**5,491,053**

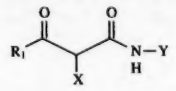
## CHROMOGENIC BLACK-AND-WHITE MOTION PICTURE FILM

**Gary N. Barber, Penfield; Patricia R. Greco, Rochester; Mitchell J. Bogdanowicz, Spencerport, and Elizabeth L. Kelly, Webster, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.**

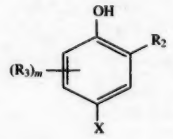
**Filed Dec. 23, 1994, Ser. No. 363,461**
**Int. Cl.[6] G03C** *7/32;7/384;7/34;7/36*
**U.S. Cl. 430—549** **13 Claims**



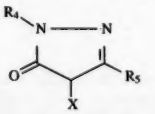

1. A photographic element for forming a neutral image comprising at least one layer comprising a photosensitive silver halide emulsion, a Formula I class yellow coupler comprising


I

wherein
$R_1$ represents a substituent;
X is hydrogen or a coupling-off group;
Y represents an aryl group or a heterocyclic group;
a Formula II class cyan coupler comprising


II

wherein
$R_2$ represents a substituent;
$R_3$ represents a substituent;
X represents a hydrogen or a coupling-off group;
m is from 1–3; and
a Formula III class magenta coupler comprising


III

wherein
$R_4$ is a substituent;
$R_5$ is a substituent;
X is hydrogen or a coupling-off group;
and which provides a relative fixed upper scale contrast between about 1.1 and 1.8.

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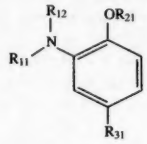
**5,491,054**

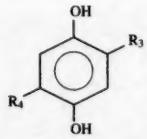
## PHOTOGRAPHIC ELEMENTS CONTAINING 2-EQUIVALENT PYRAZOLONE MAGENTA DYE FORMING COUPLERS AND STABILIZING COMPOUNDS

**Rakesh Jain, Penfield; William R. Schleigh, Rochester, and Robert C. Stewart, Spencerport, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.**

**Filed Dec. 22, 1994, Ser. No. 361,922**
**Int. Cl.[6] G03C** *7/384;7/392*
**U.S. Cl. 430—551** **13 Claims**

1. A silver halide photographic element comprising a light sensitive silver halide containing layer which layer also contains a 2-equivalent pyrazolone magenta coupler, a thiomorpholine dioxide compound which has an alkoxy substituted aryl group substituent on the ring nitrogen, a compound of formula (I) below, and a hydroquinone compound of formula (R) below:


(I)


(R)

wherein:
$R_3$, $R_4$, $R_{11}$, $R_{12}$, $R_{21}$ and $R_{31}$ are independently an alkyl group or H.

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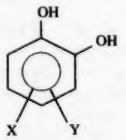
**5,491,055**

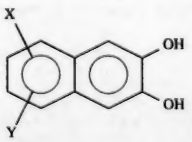
## SILVER HALIDE PHOTOGRAPHIC EMULSIONS PREPARED AND SENSITIZED IN THE PRESENCE OF SULFODIHYDROXY ARYL COMPOUNDS

**Sang H. Kim, Pittsford, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.**

**Filed Dec. 23, 1994, Ser. No. 363,476**
**Int. Cl.[6] G03C** *1/015;1/035;1/18*
**U.S. Cl. 430—567** **10 Claims**

1. An emulsion comprising tabular silver bromoiodide grains said grains comprising sensitizing dyes and adsorbed onto said grains during grain forming or sensitizing at least one sulfodihydroxy aryl compound represented by the Formula I or Formula II

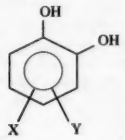

(Formula I)


(Formula II)

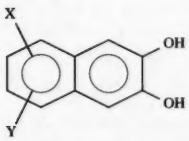
wherein

X and Y represent an $SO_3$ group or a hydrogen atom with at least one of X and Y being a sulfo group wherein said dyes and sulfodihydroxy aryl compound are on the surface of said grains and said sensitizing dyes comprise carboxy or carbamoyl substituents.

**4**. A method comprising forming a tabular silver bromoiodide emulsion, washing said emulsion, and sensitizing said emulsion by adding dyes and chemical sensitizers, and heating, wherein a sulfodihydroxy aryl compound is added to said emulsion during forming or sensitizing and said sulfodihydroxy aryl compound comprises a sulfodihydroxy aryl compound represented by the Formula I or Formula II




(Formula I)

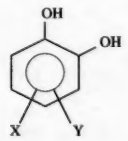



(Formula II)

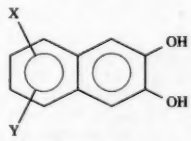
wherein

X and Y represent an $SO_3$ group or a hydrogen atom with at least one of X and Y being a sulfo group, wherein said sulfodihydroxy aryl compound is added during forming said emulsion and is not added to a silver nitrate stream, wherein said dyes and sulfodihydroxy aryl compound are on the surface of said grains and said sensitizing dyes comprise carboxy or carbamoyl substituents.

**10**. An emulsion comprising tabular silver bromoiodide grains said grains comprising sensitizing dyes and adsorbed onto said grains during grain forming or sensitizing at least one sulfodihydroxy aryl compound represented by the Formula I or Formula II



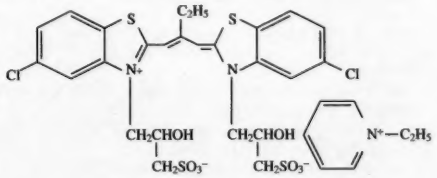

(Formula I)




(Formula II)

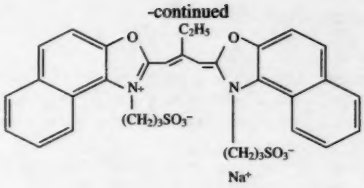
wherein

X and Y represent an $SO_3$ group or a hydrogen atom with at least one of X and Y being a sulfo group wherein said dyes and sulfodihydroxy aryl compound are on the surface of said grains and said sensitizing dyes comprise




or

-continued

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**5,491,056**

**PROCESS OF FORMING A PHOTOGRAPHIC EMULSION**

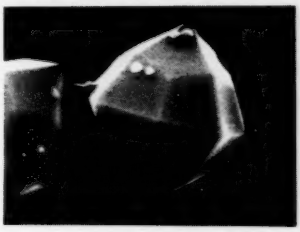
**Xin Wen, and Roger Lok, both of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.**

**Filed Aug. 26, 1994, Ser. No. 296,567**

**The portion of the term of this patent subsequent to Feb. 14, 2012, has been disclaimed.**

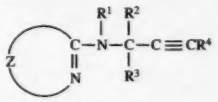
**Int. Cl.**[6] **G03C** *1/07;1/035*

**U.S. Cl. 430—569** **12 Claims**




**1**. A process of preparing a photographic emulsion comprising:

introducing silver ions, halide ions and a grain growth modifier having the structure




wherein Z represents atoms necessary to complete a five to nine-membered heterocyclic ring system, $R^1$, $R^2$ and $R^3$ independently represent hydrogen or a lower alkyl of from 1 to 5 carbon atoms, and $R^4$ represents hydrogen, or an aliphatic, carbocyclic, or heterocyclic group, which may be substituted or unsubstituted, into a dispersing medium containing silver halide seed grains; and

maintaining the dispersing medium containing the seed grains, silver halide, halide ions and grain growth modifier at a pH in the range from about 4.5 to about 10, and a pAg in the range from about 6.0 to about 9.5.

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**5,491,057**

**SILVER HALIDE EMULSION**

**Takanori Hioki, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan**

**Continuation of Ser. No. 923,527, Aug. 3, 1992, abandoned. This application Dec. 2, 1994, Ser. No. 348,767**

**Claims priority, application Japan, Aug. 14, 1991, 3-228625**

**Int. Cl.**[6] **G03C** *1/12*

**U.S. Cl. 430—584** **12 Claims**

**1**. A silver halide emulsion containing at least one methine compound of general formula (I):

$$(MET)_{k1}—[(Q)—Ar]_{k2} \quad (I)$$

wherein

Q represents a divalent linking group composed of one or more than one atoms or one or more than one atomic groups containing at least one carbon, nitrogen, sulfur or oxygen atom;

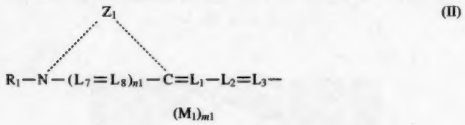
Ar represents an aromatic group containing one monocyclic compound each composed of 5 or more atoms;

k1 represents an integer of 1; and

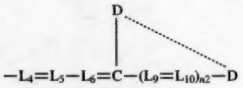
k2 represents an integer of 2 or more;

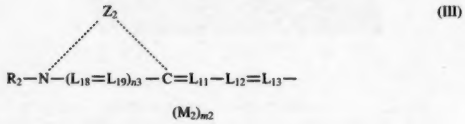
wherein the methine compound of formula (I) has an oxidation potential of 0.60 (VvsSCE) or less;

and wherein MET in formula (I) represents an atomic group which has a hexamethine-merocyanine structure of general formula (II) or a heptamethine-cyanine structure of general formula (III):

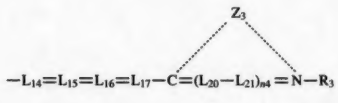


(II)





(III)



wherein

$Z_1$, $Z_2$ and $Z_3$ each represents an atomic group necessary for forming a 5-membered or 6-membered nitrogen-containing hetero ring;

the dotted line between D and D' groups may or may not indicate that those groups are linked;

D and D' each represents an atomic group necessary for forming a non-cyclic or cyclic acidic nucleus;

$R_1$, $R_2$ and $R_3$ each represents an alkyl group, wherein the substituent —(Q)—Ar groups are substituted onto any of $R_1$, $R_2$ and $R_3$ or on the nitrogen atoms in the acidic nucleus of D or D';

$L_1$, $L_2$, $L_3$, $L_4$, $L_5$, $L_6$, $L_7$, $L_8$, $L_9$, $L_{10}$, $L_{11}$, $L_{12}$, $L_{13}$, $L_{14}$, $L_{15}$, $L_{16}$, $L_{17}$, $L_{18}$, $L_{19}$, $L_{20}$ and $L_{21}$ each represents a methine group or a substituted methine group, wherein at least one combination of $L_2$ and $L_4$, $L_3$ and $L_5$, and $L_4$ and $L_6$ forms a ring and wherein at least one combination of $L_{12}$ and $L_{14}$, $L_{13}$ and $L_{15}$, and $L_{14}$ and $L_{16}$ forms a ring;

$n_1$, $n_2$, $n_3$ and $n_4$ each represents 0 or 1;

$M_1$ and $M_2$ each represents a charge-neutralizing pair ion; and

$m_1$ and $m_2$ each represents a number of 0 or more which is necessary for neutralizing the charge in the atomic group.

**5,491,058**

## FILM FOR DUPLICATING SILVER IMAGES IN RADIOGRAPHIC FILMS

**Ralph W. Jones; Catherine C. Wideman, both of Hilton, and Paul W. Twombly, Webster, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.**

**Continuation-in-part of Ser. No. 287,983, Aug. 9, 1994. This application Jun. 28, 1995, Ser. No. 495,913**

**Int. Cl.[6] G03C** *1/485*

**U.S. Cl. 430—596** **13 Claims**

1. A radiographic duplicating film for duplicating a silver image in a radiographic taking film, the radiographic duplicating film being comprised of

a transparent film support,

a direct-positive imaging unit exhibiting an average contrast of from −0.8 to −1.2 over an exposure range measured from a density of 0.5 to a density of 2.5, and

a protective overcoat free of microcrystaline dye particles,

wherein the direct-positive imaging unit consists of a single, direct-positive emulsion layer and contains

(a) surface fogged silver halide grains for recording exposure to electromagnetic radiation that has in part passed through the radiographic taking film and has been in part absorbed by the silver image within the radiographic taking film

(1) having a mean grain equivalent circular diameter in the range of from 0.20 to 0.70 μm,

(2) exhibiting a coefficient of variation of grain equivalent circular diameter of less than 20 percent,

(3) coated at a silver coverage of from 2.0 to 3.5 $g/m^2$, and

(4) containing at least 50 mole percent bromide and less than 3 mole percent iodide, based on silver, any remaining halide being chloride, and

(b) microcrystalline particles

(1) consisting essentially of a dye capable of absorbing a portion of the electromagnetic radiation received from the radiographic taking film and capable of being decolorized during photographic processing,

(2) having a mean equivalent circular diameter of less than 1 μm and

(3) coated at a coverage of from 10 to 50 percent by weight, based on the weight of silver forming the surface fogged silver halide grains.

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**5,491,059**

## SILVER CARBOXYLATE COMPOUNDS AS SILVER SOURCES IN PHOTOTHERMOGRAPHIC AND THERMOGRAPHIC ELEMENTS

**David R. Whitcomb, Woodbury, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.**

**Filed Oct. 31, 1994, Ser. No. 331,683**

**Int. Cl.[6] G03C** *1/498*

**U.S. Cl. 430—618** **22 Claims**

1. A photothermographic element comprising a support bearing at least one heat-developable, photosensitive, image-forming photothermographic emulsion layer comprising:

(a) a photosensitive silver halide;

(b) a non-photosensitive, reducible source of silver comprising a silver carboxylate compound of the formula

$$R^3—X—(CH_2—CH_2—X)_n—L—CR^1R^2—COO^-Ag$$

wherein:

$R^1$ and $R^2$ are each independently hydrogen, halogen, an alkyl group, or an aryl group;

$R^3$ is an alkyl group, an aryl group, or $L—CR^1R^2—COO^-Ag$;

L is a linking group that links $CR^1R^2$ to X;

X is selected from the group consisting of O, S, and $NR^4$, wherein $R^4$ is chosen from alkyl, substituted alkyl, aromatic, or substituted aromatic; and

n is an integer from 0 to 12;

(c) a reducing agent for the non-photosensitive, reducible source of silver; and

(d) a binder.

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**5,491,060**

## MUTANT STRAIN OF *E. COLI* FOR DETECTION OF METHYLTRANSFERASE CLONES

**Daniel C. Stein, Silver Spring; Andrejez S. Piekarowicz, Adelphi, and Robert T. Yuan, Gaithersburg, all of Md., assignors to The University of Maryland, College Park, Md.**

**Continuation of Ser. No. 345,292, May 1, 1989, abandoned. This application Oct. 6, 1992, Ser. No. 956,578**

**Int. Cl.**[6] **C12Q** *1/68;* **C12N** *15/09;15/54;15/55*

**U.S. Cl. 435—6** **15 Claims**

1. A method for detecting *E. coli* bacterial cells containing a cloned methyltransferase gene, said cells expressing a methyltransferase enzyme, comprising:

transforming an *E. coli* bacterial cell having a gene encoding the production of a temperature sensitive DNA restriction enzyme reactive with DNA methylated by said methyltransferase, by combining said cell with a plasmid encoding said methyltransferase, said enzymae being active at a first temperature range termed the non-permissive temperature and inactive at a second temperature range termed the permissive temperature,

cultivating said cell at both said permissive and non-permissive temperature ranges,

wherein cells which grow at said permissive temperature range and do not grow at said non-permissive temperature range are expressing said methyltransferase.

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**5,491,061**

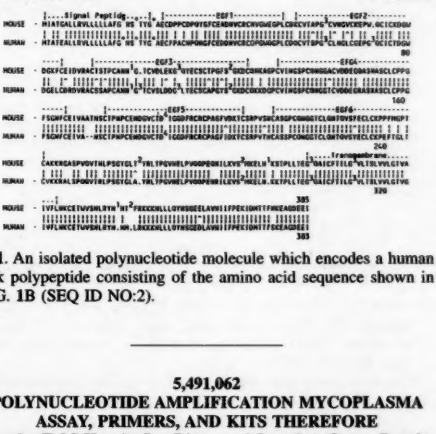
## DELTA-LIKE GENE EXPRESSED IN NEUROENDOCRINE TUMORS

**Jorge Laborda, Silver Spring, Md., assignor to The United States of America as represented by the Secretary of Department of Health and Human Services, Washington, D.C.**

**Filed Dec. 11, 1992, Ser. No. 989,537**

**Int. Cl.**[6] **C12Q** *1/68;* **C07H** *21/00*

**U.S. Cl. 435—6** **5 Claims**



1. An isolated polynucleotide molecule which encodes a human Dlk polypeptide consisting of the amino acid sequence shown in FIG. 1B (SEQ ID NO:2).

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**5,491,062**

## POLYNUCLEOTIDE AMPLIFICATION MYCOPLASMA ASSAY, PRIMERS, AND KITS THEREFORE

**Douglas T. McKenzie, San Diego, and Joseph A. Sorge, Rancho Santa Fe, both of Calif., assignors to Stratagene, La Jolla, Calif.**

**Filed Nov. 23, 1993, Ser. No. 158,681**

**Int. Cl.**[6] **C12Q** *1/68;* **C07H** *21/04;* **C12P** *19/34*

**U.S. Cl. 435—6** **8 Claims**

1. A method of detecting mycoplasma in a sample for analysis, said method comprising the steps,

isolating polynucleotides from said sample for analysis, whereby a polynucleotide sample is produced

adding a pair of polynucleotide primers which hybridize to a mycoplasma tRNA gene, to said polynucleotide sample,

amplifying at least a portion of at least one tRNA gene cluster by a cyclic amplification reaction employing said primers, whereby at least one amplification product is produced, and detecting said amplified product, wherein said detection of amplified probe is indicative of the presence of mycoplasma,

wherein said pair of primers is selected from the group consisting of:

(a) Primer 772 5'CGAAGGGTCGCAGGTTCAAA3' (SEQ ID No: 1), and Primer 773 5'CTCAGTCGGTAGAGCAGCAGA3' (SEQ ID No: 2),

(b) Primer 772 5'CGAAGGGTCGCAGGTTCAAA3' (SEQ ID No: 1), and Primer 965 5'AGTCCGGTGCTCTAACCAACTGAG3' (SEQ ID No: 5),

(c) Primer 964 5'AGGTCGCGGGTTCGAATCC3' (SEQ ID No: 4), and Primer 773 5'CTCAGTCGGTAGAGCAGCAGA3' (SEQ ID No: 2),

(d) Primer 964 5'AGGTCGCGGGTTCGAATCC3' (SEQ ID No: 4), and Primer 774, 5'CTCAGTCGGTTAGAGCAGCAG3' (SEQ ID No: 3),

(e) Primer 415 5'CGGAGGYCGCAGGTTCGAG3' (SEQ ID No: 6), and Primer 965 5'AGTCCGGTGCTCTAACCAACTGAG3' (SEQ ID No: 5),

(f) Primer 415 5'CGGAGGYCGCAGGTTCGAG3' (SEQ ID No: 6), and Primer 773 5'CTCAGTCGGTAGAGCAGCAGA3' (SEQ ID No: 2),

(g) Primer 415 5'CGGAGGYCGCAGGTTCGAG3' (SEQ ID No: 6), and Primer 774 5'CTCAGTCGGTTAGAGCAGCAG3' (SEQ ID No: 3), and

(h) Primer 773 5'CTCAGTCGGTAGAGCAGCAGA3' (SEQ ID No: 2), and Primer 772 5'CGAAGGGTCGCAGGTTCAAA3' (SEQ ID No: 1).

5. A polynucleotide primer wherein the primer consists of the nucleotide sequence selected from the group consisting of:

Primer 772 5'CGAAGGGTCGCAGGTTCAAA3' (SEQ ID No: 1),
Primer 773 5'CTCAGTCGGTAGAGCAGCAGA3' (SEQ ID No: 2),
Primer 774, 5'CTCAGTCGGTTAGAGCAGCAG3' (SEQ ID No: 3),
and Primer 415 5'CGGAGGYCGCAGGTTCGAG3' (SEQ ID No: 6).

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**5,491,063**

## METHODS FOR IN-SOLUTION QUENCHING OF FLUORESCENTLY LABELED OLIGONUCLEOTIDE PROBES

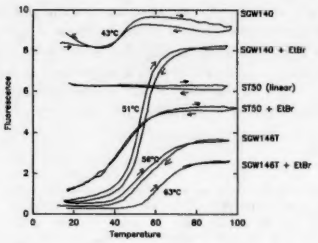
**Mary E. Fisher, Oakland, and Robert M. Watson, Berkeley, both of Calif., assignors to Hoffmann-La Roche Inc., Nutley, N.J.**

**Filed Sep. 1, 1994, Ser. No. 299,682**

**Int. Cl.**[6] **C12Q** *1/70;1/68;* **C07H** *19/04;* **C12P** *19/34*

**U.S. Cl. 435—6** **9 Claims**

1. A method for controlling the light emission of a single-stranded oligonucleotide covalently labeled with a light-emitting label in solution comprising incorporating into said solution a DNA binding compound, wherein said DNA binding compound can interact with said label to modify the light emission of said label.




5,491,064

**HTS-1 GENE, A HUMAN TUMOR SUPPRESSOR GENE**

**Jack H. Lichy, Silver Spring, and Peter M. Howley, Potomac, both of Md., assignors to The United States of America as represented by the Department of Health and Human Services, Washington, D.C.**

**Continuation of Ser. No. 916,762, Jul. 17, 1992, abandoned. This application Jan. 5, 1995, Ser. No. 369,043**

**Int. Cl.[6] C12Q** *1/68;* **C07H** *21/04*

**U.S. Cl. 435—6** **22 Claims**

**12**. A method of detecting the presence of the human tumor suppressor 1 gene in a physiological specimen, said method comprising;

(i) contacting a nucleic acid probe which is at least 12 continuous nucleotides in length and is specific for binding to human tumor suppressor 1 gene with said specimen under conditions which allow said nucleic acid probe to anneal to complementary sequences in said sample; and

(ii) detecting duplex formation between said nucleic acid probe and said complementary sequences.

5,491,065

**MONOCLONAL ANTIBODIES THAT BIND TO AND NEUTRALIZE DIMERIC BUT NOT MONOMERIC HUMAN M-CSF AND METHODS OF USE THEREOF FOR DETECTION OF DIMERIC M-CSF**

**Robert F. Halenbeck, San Rafael; Kirston E. Koths, El Cerrito, and Joseph W. Wrin, San Francisco, all of Calif., assignors to Cetus Oncology Corporation, Emeryville, Calif.**

**Continuation of Ser. No. 919,500, Jul. 24, 1992, abandoned, which is a continuation of Ser. No. 310,042, Feb. 10, 1989, abandoned. This application Nov. 19, 1993, Ser. No. 156,862**

**Int. Cl.[6] G01N** *33/53;* **C07K** *16/24;* **C12N** *5/20*

**U.S. Cl. 435—7.1** **10 Claims**

1. A mouse monoclonal antibody that:

a) specifically binds to an epitope on dimeric, human M-CSF which is recognized by monoclonal antibody 382-5H4 1A8 1F6 secreted by a hybridoma on deposit with the American Type Culture Collection with Accession Number HB10027;

b) does not measurably bind to monomeric human M-CSF; and

c) neutralizes the biological activity of human M-CSF as determined by the ability of the monoclonal antibody to inhibit M-CSF bioactivity in vitro.

5,491,066

**ANTI-HUMAN CERULOPLASMIN MONOCLONAL ANTIBODY**

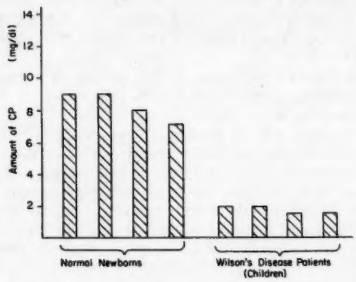
**Shuichi Hiyamuta; Keiko Shimizu, and Akihiko Kodota, all of Sodegaura, Japan, assignors to Idemitsu Kosan Company Limited, Japan**

**Filed Mar. 11, 1993, Ser. No. 29,582**

**Claims priority, application Japan, Jan. 13, 1993, 5-020621**

**Int. Cl.[6] G01N** *33/573;33/577*

**U.S. Cl. 435—7.4** **12 Claims**




1. A method for detecting or quantifying active human ceruloplasmin which comprises:

contacting a sample to be assayed with an antibody, wherein said antibody specifically binds to active human ceruloplasmin, wherein said antibody neutralizes the peroxidase activity of the active human ceruloplasmin upon binding thereto, and wherein said antibody further does not bind specifically to inactive human ceruloplasmin, to form an antibody-ceruloplasmin complex; and

measuring the amount of said antibody-ceruloplasmin complex so formed, thereby detecting or quantifying active human ceruloplasmin in said sample.

**11**. A method for diagnosing Wilson's disease by measuring the amount of active ceruloplasmin in a sample which comprises:

obtaining a sample of body fluid from a human patient; performing a method of quantifying an amount of active human ceruloplasmin in said sample according to any one of the preceding claims; and

comparing the amount of active human ceruloplasmin in said sample from the patient with the amount of active human ceruloplasmin in a sample obtained from a normal human, wherein a lessened amount of active human ceruloplasmin in said sample from the patient is indicative of Wilson's disease in the patient.

5,491,067

**AGGLUTINATION REACTION AND SEPARATION VESSEL**

**Thomas M. Setcavage; Kathleen J. Reis, both of Milford; Donald M. Davies, Raritan, and Edward J. Mazur, Montville, all of N.J., assignors to Ortho Diagnostic Systems Inc., Raritan, N.J.**

**Continuation of Ser. No. 92,157, Jul. 15, 1993, abandoned. This application Jul. 16, 1993, Ser. No. 93,106**

**Int. Cl.[6] G01N** *33/536;33/537;33/538;33/558*

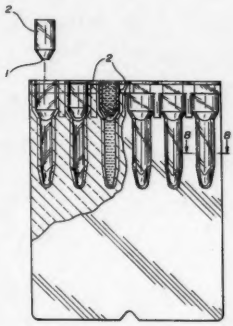
**U.S. Cl. 435—7.25** **11 Claims**

1. A vessel for conducting an agglutination assay comprising:

a) an upper chamber having an opening for accepting fluid reactants;

b) a lower chamber disposed to receive fluid from the upper chamber and containing a matrix for separating agglutinates; and

c) a barrier separating the upper chamber from the lower chamber and having means for retaining fluid in the upper chamber under normal gravity and atmospheric conditions, while per-



mitting passage of the fluid from the upper chamber to the lower chamber under pressure greater than atmospheric pressure.

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**5,491,068**

**ASSAY METHOD FOR DETECTING THE PRESENCE OF BACTERIA**

**Thomas L. Benjamin, Cambridge; Joan Chen-Wu; Thomsen Hansen, both of Brookline; Barbara Jackson, Roslindale; David Livingston, Brookline; Steven Tannenbaum, Framingham, and Gerald Wogan, Belmont, all of Mass., assignors to Vicam, L.P., Watertown, Mass.**

**Continuation-in-part of Ser. No. 654,967, Feb. 14, 1991, abandoned. This application Dec. 31, 1992, Ser. No. 999,363**

**Int. Cl.**[6] **G01N** *33/02;33/538;33/547;33/569*

**U.S. Cl. 435—7.32** **75 Claims**

1. A method for detecting the presence of an organism capable of being cultured which comprises:

a) combining a sample to be tested for the presence of a selected organism with a magnetic solid support having immobilized thereon antibodies to said selected organism, to thereby capture cells of said selected organism from said sample, said magnetic solid support being non-porous magnetic beads having a diameter of from 50 nm to 1 μm;

b) exposing to a magnetic field said magnetic beads having bound thereto said first antibodies and captured selected organisms to thereby separate said magnetic solid support from said sample;

c) culturing the thus captured magnetic solid support and captured selected organisms on a solid medium to form colonies of said selected organism;

d) contacting said colonies with a colony lift membrane whereby some colony material adheres to said membrane; and

e) treating said membrane to detect the presence on said membrane of material from said colonies of said selected organism.

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**5,491,069**

**BIOMARKERS OF CELL SENESCENCE**

**Goberdhan P. Dirmi, Simli U.P., Ind.; Judith Campisi, Berkeley, Calif., and Monica Peacocke, Newton, Mass., assignors to The Regents of the University of California, Oakland, Calif.**

**Filed Feb. 18, 1994, Ser. No. 198,436**

**Int. Cl.**[6] **C12Q** *1/34;* **C12N** *9/38;* **G01N** *21/75;21/76*

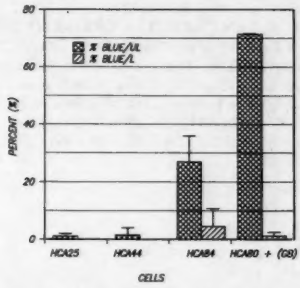
**U.S. Cl. 435—18** **14 Claims**

1. A method for differentiating between senescent and young cells, comprising the steps of:

a) providing:

i) senescent cells,

ii) young cells,




iii) substrate for β-galactosidase activity; and

iv) a buffer having a pH between approximately 5.5 and 6.5; and

b) exposing said senescent cells and said young cells to said buffer containing said β-galactosidase substrate under conditions such that at least 90% of said senescent cells display β-galactosidase activity and said young cells display no significant β-galactosidase activity.

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**5,491,070**

**Patent Not Issued For This Number**

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**5,491,071**

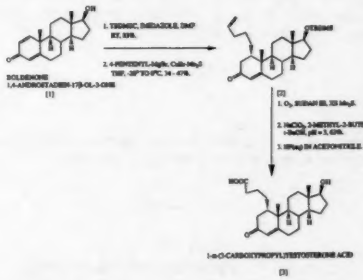
**REAGENTS AND METHODS FOR THE DETECTION AND QUANTIFICATION OF TESTOSTERONE IN FLUID SAMPLES**

**Maciej Adamczyk, Gurnee; Yon-Yih Chen, Mundelein, both of Ill.; John A. Walling, Charles City, Iowa; Bryan D. James, Chicago, and Sharon G. Artrip, Elmhurst, both of Ill., assignors to Abbott Laboratories, Abbott Park, Ill.**

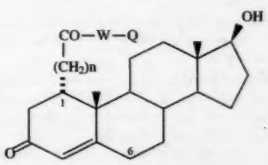
**Filed Aug. 3, 1993, Ser. No. 102,083**

**Int. Cl.**[6] **C12Q** *1/26;1/00;1/54*

**U.S. Cl. 435—25** **19 Claims**



1. A Position 1 labeled reagent having the following structural formula, wherein Q is a detectable moiety, W is a linking moiety, and n is between 2 and 10, inclusively:



**5,491,072**

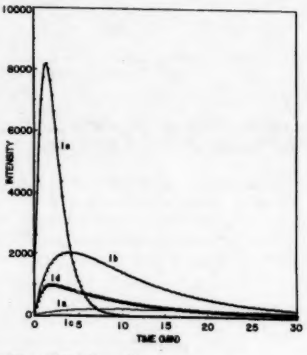
## N-ALKYLACRIDAN CARBOXYL DERIVATIVES USEFUL FOR CHEMILUMINESCENT DETECTION

**Hashem Akhavan-Tafti, Sterling Heights; Renuka Desilva, Northville, and Katsuaki Sugioka, Farmington Hills, all of Mich., assignors to Lumigen, Inc., Southfield, Mich.**

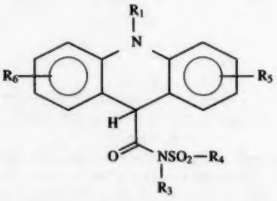
**Filed May 17, 1993, Ser. No. 61,810**

**Int. Cl.[6] C12Q** *1/28;1/26;1/00;* **C07H** *5/04*

**U.S. Cl. 435—28** **68 Claims**




**1**. An acridan of the formula




wherein $R_1$ is selected from the group consisting of alkyl, heteroalkyl and aralkyl groups, wherein $R_3$ and $R_4$ are selected from the group consisting of substituted and unsubstituted aryl groups and alkyl, heteroalkyl and aralkyl groups and wherein $R_5$ and $R_6$ are selected from the group consisting of hydrogen and non-interfering substituents and wherein

is a leaving group which allows the production of light from the acridan by reaction with a peroxide and a peroxidase.

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**5,491,073**

## CLONING OF CHICKEN ANAEMIA DNA

**Matheus H. M. Noteborn, Leiden, and Gerben F. de Boer, Lelystad, both of, Netherlands, assignors to Aesculaap B.V., Boxtel, Netherlands**

**PCT No. PCT/NL91/00165, § 371 Date Mar. 8, 1993, § 102(e) Date Mar. 8, 1993**

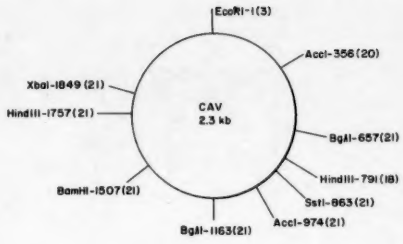
**PCT Filed Sep. 11, 1991, Ser. No. 30,335**

**Int. Cl.[6] C12P** *21/06;* **C07H** *21/02;21/04;* **C12N** *5/00*

**U.S. Cl. 435—69.1** **9 Claims**

**1**. An isolated and purified double-stranded recombinant nucleic acid comprising a chicken anemia virus (CAV)-specific nucleotide sequence consisting of the nucleotide sequence shown in FIG. 1 (SEQ ID NO: 1) and its complemetary strand.

**9**. A method for expressing protein in avian systems comprising transfecting an avian system with a vector comprising an isolated and purified recombinant nucleic acid in accordance with claim 1.

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**5,491,074**

## ASSOCIATION PEPTIDES

**Lois Aldwin, San Mateo; Mark Madden, Davis, and Willem P. C. Stemmer, Los Gatos, all of Calif., assignors to Affymax Technologies NV, Curacao, Netherlands**

**Continuation-in-part of Ser. No. 171,893, Dec. 22, 1993, which is a continuation of Ser. No. 43,459, Apr. 1, 1993, abandoned. This application May 24, 1993, Ser. No. 67,387**

**Int. Cl.[6] C12P** *21/02*

**U.S. Cl. 435—69.7** **10 Claims**

**1**. A method for joining two or more peptides or proteins, said method comprising the steps of:

(a) attaching an association peptide to either the N- or C-terminus of each of said peptides or proteins to be joined, to form a fusion complex for each of said peptides or proteins to be joined wherein said association peptide comprises the amino acid residue sequence SKVILF (SEQ ID NO:1 ) and wherein the peptides or proteins to be joined together are attached to said association peptide's amino-terminus or to said association peptide's carboxy terminus, provided that if the peptides or proteins are attached to said carboxy terminus, then a free carboxyl group is positioned adjacent to the F residue of said association peptide; and

(b) mixing the fusion complexes resulting from step (a) under conditions that allow said association peptide to dimerize.

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**5,491,075**

## CLONING AND EXPRESSION OF BIOLOGICALLY ACTIVE α-N-ACETYLGALACTOSAMINIDASE

**Robert J. Desnick; David F. Bishop; Yiannis A. Ioannou, and Anne M. Wang, all of New York, N.Y., assignors to The Mount Sinai School of Medicine of the City University of New York, New York, N.Y.**

**Division of Ser. No. 602,608, Oct. 24, 1990, Pat. No. 5,382,524. This application Jun. 17, 1994, Ser. No. 261,578**

**Int. Cl.[6] C12N** *15/62;9/40;15/56*

**U.S. Cl. 435—69.7** **15 Claims**

**5**. A method for producing human α-N-acetylgalactosaminidase, comprising:

a. culturing a mammalian cell containing a nucleotide sequence encoding a cleavage site sandwiched between an α-N-acetylgalactosaminidase coding sequence and a protein antigen coding sequence arranged in the same translational reading frame, controlled by a second nucleotide sequence that regulates gene expression so that a fusion protein is expressed by the cell;

b. recovering the fusion protein from the culture by reaction with an immunoglobulin directed against the protein antigen;

c. treating the fusion protein with a substance that cleaves the cleavage site so that the α-N-acetylgalactosaminidase is separated from the protein antigen; and

d. recovering the separated α-N-acetylgalactosaminidase.

5,491,076

## EXPRESSION OF FOREIGN GENES USING A REPLICATING POLYPROTEIN PRODUCING VIRUS VECTOR

**James C. Carrington, and Valerian V. Dolja, both of College Station, Tex., assignors to The Texas A&M University System, College Station, Tex.**

**Filed Nov. 1, 1993, Ser. No. 146,881**

**Int. Cl.[6] C12N *7/01;15/01;* C12P *21/00***

**U.S. Cl. 435—70.1** **9 Claims**

6. A method for expressing at least one protein in a plant or plant cell, said method comprising infecting a plant or plant cell susceptible to a polyprotein-producing Tobacco Etch Virus with said Tobacco Etch Virus, expressing said Tobacco Etch Virus to produce said polyprotein, wherein said Tobacco Etch Virus codes for at least one protein non-native to the Tobacco Etch Virus and wherein said non-native protein is released from said polyprotein by proteolytic processing.

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5,491,077

## MICROBIAL METHOD

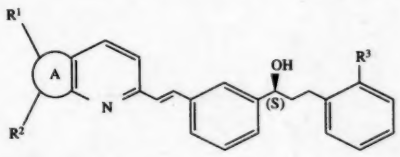
**Michel M. Chartrain, Westfield; Shieh-Shung T. Chen, Morganville; George M. Garrity, Westfield; Brian Heimbuch, North Brunswick; Christopher Roberge, Clark, and Ali Shafiee, Westfield, all of N.J., assignors to Merck & Co., Inc., Rahway, N.J.**

**Filed Jul. 20, 1994, Ser. No. 277,728**

**Int. Cl.[6] C12P *17/16;17/12***

**U.S. Cl. 435—118** **8 Claims**

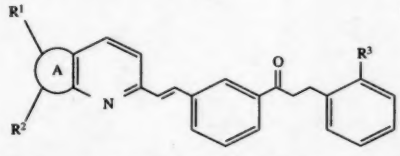
1. A process for the preparation of a compound of formula (III)




(III)

which comprises:

(1) contacting a compound of formula (IV)




(IV)

with Microbacterium MB5614 ATCC 55557, or a mutant thereof; and

(2) isolating the compound of formula (III);

wherein

A is —CH=CH—S— or —CH=CH—CH=CH—CH—;

$R^1$ and $R^2$ are independently hydrogen or a halogen;

$R^3$ is $CO_2R^6$, $COR^6$ or $C(R^7)_2$—O—$R^8$;

$R^6$ is hydrogen or lower alkyl;

$R^7$ is lower alkyl; and

$R^8$ is hydrogen or a hydroxy protecting group.

5,491,078

## LEACH SOLUTION CONTAINING GLUCOSE, GALACTOSE, CATALASE, GLUCOSE OXIDASE, GALACTOSE OXIDASE, ASCORBIC ACID AND WATER SOLUBLE METAL CYANIDES AND HALIDES

**John R. Clark, 7778 Lewis St., Arvada, Colo. 80005**

**Division of Ser. No. 962,477, Oct. 16, 1992, Pat. No. 5,385,827, which is a division of Ser. No. 788,543, Nov. 6, 1991, abandoned, which is a continuation-in-part of Ser. No. 409,752, Sep. 20, 1989, abandoned. This application Dec. 12, 1994, Ser. No. 355,396**

**Int. Cl.[6] C12P *3/00;* C12Q *1/64;* C12N *9/04;* B01D *11/00***

**U.S. Cl. 435—168** **7 Claims**

1. A leach solution for selectively leaching metal sulfide containing material for separating metals therefrom, said solution comprising water, glucose in the amount of from 0.000001 g/ml to 0.2 g/ml, glucose oxidase in the amount of from 0.015 units/ml to 1250 units/ml, and a salt selected from the group consisting of water soluble metal cyanides and water soluble metal halides, said salt providing a concentration of said cyanide or said halide in the amount of from 0.000002 molar to 2.0 molar.

6. A leach solution for selectively leaching metal sulfide containing material for separating metals therefrom, said solution comprising water, a sugar selected from the group consisting of glucose and galactose in the amount of from 0.000001 g/ml to 0.2 g/ml, a sugar enzyme selected from the group consisting of glucose oxidase and galactose oxidase in the amount of from 0.015 units/ml to 1250 units/ml which acts upon said glucose or said galactose to produce a weak organic acid and hydrogen peroxide, and a salt selected from the group consisting of water soluble metal cyanides and water soluble metal halides, said salt providing a concentration of said cyanide or said halide in the amount of from 0.000002 molar to 2.0 molar.

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5,491,079

## PROMOTERLESS FOREIGN GENE INTEGRATED IN *STREPTOCOCCUS THERMOPHILUS*

**Jan Knol, Groningen, Netherlands; Olivier Marciset, Lausanne, and Beat Mollet, Mollie-Margot, both of, Switzerland, assignors to Nestec S.A., Vevey, Switzerland**

**Filed Mar. 30, 1993, Ser. No. 39,866**

**Claims priority, application European Pat. Off., Apr. 7, 1992, 92105973**

**Int. Cl.[6] C12N *15/09;1/13;* C12P *21/00***

**U.S. Cl. 435—172.3** **6 Claims**

1. A process for integrating a promoterless foreign gene into the lac operon of *Streptococcus thermophilus* comprising:

transforming a host strain of *Streptococcus thermophilus* with a donor plasmid which does not replicate in the host strain, wherein the genome of the host strain includes a deletion within the lacZ gene which imparts a lac(−) phenotype to the host strain, and wherein the donor plasmid comprises a vector backbone and a sequence comprising a foreign gene lacking its native promoter operably integrated into at least a part of the lac operon of the host strain, in front of at least a part of the lacZ gene of the lac operon, wherein the donor plasmid comprises the fragment deleted from the lacZ gene of the host strain and wherein the sequence conserves the frame of the genomic lac operon of the host strain;

identifying cointegrate transformants in which the complete donor plasmid is integrated into the genomic lac operon of the host strain; and

subcultivating identified cointegrate transformants an screening for lac(+) phenotype to identify an integrant transformant, the genome of which does not include the vector backbone of the donor plasmid but does include the foreign gene, which is operably integrated in front of the lacZ gene of the conserved genomic lac operon and which is stably maintained and expressed upon selective pressure on expression of the lacZ gene.

5,491,080

## PLANTS RESISTANT AGAINST PLURAL VIRUSES AND METHOD FOR PRODUCING THEM USING AS RNASE GENES

Isao Ishida, Yokohama, and Yoshimi Okada, Matsudo, both of, Japan, assignors to Kirin Beer Kabushiki Kaisha, Tokyo, Japan

PCT No. PCT/JP93/00494, § 371 Date Feb. 17, 1994, § 102(e) Date Feb. 17, 1994, PCT Pub. No. WO93/20686, PCT Pub. Date Oct. 28, 1993

PCT Filed Apr. 16, 1993, Ser. No. 157,189

Claims priority, application Japan, Apr. 17, 1992, 4-122837; Dec. 2, 1992, 4-349791

Int. Cl.[6] C12N *15/00;* A01H *1/04*

U.S. Cl. 435—172.3 12 Claims

1. A method for producing a plant having resistance against RNA viruses, comprising integrating a DNA sequence, which encodes a protein having an enzyme activity that specifically cleaves a double-strand RNA, into a chromosome of a plant and making the DNA sequence express in the plant cells.

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5,491,081

## SOYBEAN CYST NEMATODE RESISTANT SOYBEANS AND METHODS OF BREEDING AND IDENTIFYING RESISTANT PLANTS

David M. Webb, Johnston, Iowa, assignor to Pioneer Hi-Bred International, Inc., Des Moines, Iowa

Filed Jan. 26, 1994, Ser. No. 187,569

Int. Cl.[6] G01N *21/76;* C07H *21/00;* A01H *1/04;5/00;* A01C *1/00*

U.S. Cl. 435—172.3 10 Claims

1. A method of reliably and predictably introgressing soybean cyst nematode resistance into non-resistant soybean germplasm comprising using one or more nucleic acid markers for marker assisted selection among soybean lines to be used in a soybean breeding program, wherein the nucleic acid markers are pA85a, php02302a, php02340a, pk400a, pt155a, pBLT24a, php05180a, pSAC3a, pA11116, php02366a, php02361a, UBC440a, pk69a, pL50b, pA226a, pA715a, pk24a, pB157b, php02275a, UBC379a, OPC-04a, or php02301a; further comprising introgressing said resistance into said non-resistant soybean germplasm.

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5,491,082

## PLASMINOGEN ACTIVATOR COVALENTLY BONDED TO A POROUS BODY OF β-TRICALCIUM PHOSPHATE

Takahiro Suzuki, Nagoya; Sukezo Kawamura, Inuyama; Motohiro Toriyama, Kasugai; Yoshiyuki Yokokawa; Yukari Kawamoto, both of Nagoya; Yasuharu Hakamatsuka, and Hiroyuki Irie, both of Hachioji, all of, Japan, assignors to Director-General of Agency of Industrial Science and Technology, and Olympus Optical Co., Ltd., both of Tokyo, Japan

Continuation-in-part of Ser. No. 852,550, Mar. 17, 1992, abandoned. This application May 20, 1994, Ser. No. 246,940

Claims priority, application Japan, Mar. 18, 1991, 3-077202

Int. Cl.[6] C12N *11/14;9/72;* A61K *38/48*

U.S. Cl. 435—176 4 Claims

1. A plasminogen activator-porous body complex comprising:

a porous body comprising a chemically synthesized β-tricalcium phosphate; and

a plasminogen activator covalently bonded to the porous body;

said complex being formed by the process comprising:

immersing said porous body in a dilute solution of a plasminogen activator and covalently bonding said plasminogen activator to said porous body.

5,491,083

## IMMOBILIZATION OF BIOMOLECULES ON A FLUOROCARBON SURFACE WITH A POLY(FLUOROALKYL) SUGAR REAGENT

Rene Arentzen; Prabhakar K. Jadhav; Robert K. Kobos, and Bruce E. Smart, all of Wilmington, Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

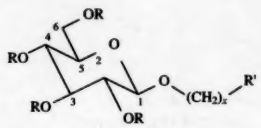
Division of Ser. No. 63,676, May 20, 1993, Pat. No. 5,384,254, which is a division of Ser. No. 586,173, Sep. 21, 1990, Pat. No. 5,243,037. This application Oct. 5, 1994, Ser. No. 318,398

Int. Cl.[6] C12N *11/06;11/08;* C07H *15/00;* C07K *3/18*

U.S. Cl. 435—181 16 Claims

1. A process for immobilizing a biomolecule on a solid fluorocarbon polymer surface comprising the steps of:

forming a conjugate by attaching to a biomolecule a poly(fluoroalkyl) sugar reagent, containing a sugar having multiple hydroxy groups to which are attached a plurality of fluoroalkyl anchor groups capable of adsorbing to a solid fluorocarbon polymer surface and a reactive group capable of attaching to a biomolecule, and adsorbing the conjugate on a solid fluorocarbon polymer surface to obtain said immobilized biomolecule, wherein the sugar reagent is selected from the group consisting of:

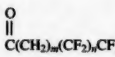



(i)

wherein

x=1–10;

R is

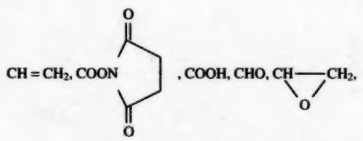



wherein

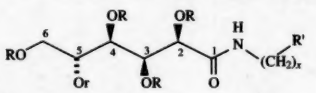
m=1–5;

n=3–20; and

R' is:




CONHNH$_2$, $CH_2NH2$, or $CH_2NHCOOCH_2Ph$,




(ii)

wherein

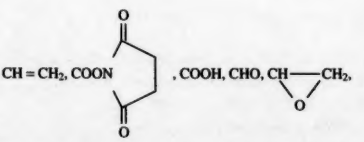
x=1–10;

R is $CO(CH_2)_m(CF_2)_nCF_3$ wherein

m=1–5;

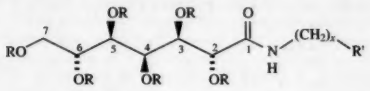
n=3–20; and

R' is




CONHNH$_2$, $CH_2NH2$, or $CH_2NHCOOCH_2Ph$, and

-continued



wherein:

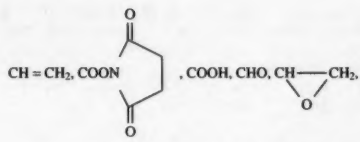
x=2–10;

R is $CO(CH_2)_m(CF_2)_nCF_3$ wherein

m is 1–5;

n is 3–20; and

R' is:



$CONHNH_2$, $CH_2NH2$, or $CH_2NHCOOCH_2Ph$.

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**5,491,084**

**USES OF GREEN-FLUORESCENT PROTEIN**

**Martin Chalfie, New York, N.Y., and Douglas Prasher, East Falmouth, Mass., assignors to The Trustees of Columbia University in the City of New York, New York, N.Y., and Woods Hole Oceanographic Institution, Woods Hole, Mass.**

**Filed Sep. 10, 1993, Ser. No. 119,678**

**Int. Cl.[6] C12N** *9/02;5/00;* **C12P** *21/06;* **C07H** *19/00*

**U.S. Cl. 435—189** **12 Claims**

1. A host cell comprising a DNA molecule having a regulatory element from a gene, other than a gene encoding an *Aequorea victoria* green-fluorescent protein operatively linked to a DNA sequence encoding the fluorescent *Aequorea victoria* green-fluorescent protein.

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**5,491,085**

**METHOD OF RECOVERING PEROXIDASE FROM SEED HULLS USING A FREEZE-THAW TECHNIQUE**

**Alexander R. Pokora, Pickerington, and Mark A. Johnson, Chillicothe, both of Ohio, assignors to Enzymol International, Inc., Columbus, Ohio**

**Filed May 14, 1991, Ser. No. 699,905**

**Int. Cl.[6] C12N** *9/08;9/06;9/04*

**U.S. Cl. 435—192** **9 Claims**

1. A method for recovering peroxidase as a solution in water comprising:

preparing a homogenate of seed hulls containing peroxidase in water, freezing said homogenate, thawing said frozen homogenate, and separating the particles from said homogenate to obtain a solution of said peroxidase in said water.

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**5,491,086**

**PURIFIED THERMOSTABLE NUCLEIC ACID POLYMERASE AND DNA CODING SEQUENCES FROM PYRODICTIUM SPECIES**

**David H. Gelfand, Oakland, and Alice M. Wang, Lafayette, both of Calif., assignors to Hoffmann-La Roche Inc., Nutley, N.J.**

**Filed May 14, 1993, Ser. No. 62,368**

**Int. Cl.[6] C12N** *9/12;15/54;15/74;1/19*

**U.S. Cl. 435—194** **20 Claims**

1. A purified protein that consists of an amino acid sequence that is SEQ ID NO: 2 or SEQ ID NO: 4.

**5,491,087**

**THERMOSTABLE ARABINO FURANOSIDE PRODUCED BY *BACILLUS STEAROTHERMOPHILUS* NRRL B-18659, *BACILLUS STEAROTHERMOPHILUS* NRRL B-18660 AND *BACILLUS STEAROTHERMOPHILUS* NRRL B-18661**

**Bruce L. Zamost, Danbury, and Dana D. Elm, Waterbury, both of Conn., assignors to Novo Nordisk A/S, Bagsvaerd, Denmark**

**Division of Ser. No. 87,476, Jul. 2, 1993, abandoned, which is a continuation of Ser. No. 961,044, Oct. 14, 1992, abandoned, which is a continuation of Ser. No. 535,099, Jun. 8, 1990, abandoned. This application Apr. 6, 1995, Ser. No. 418,044**

**Int. Cl.[6] C12N** *9/24;1/20;1/00;* **D21C** *3/00*

**U.S. Cl. 435—200** **4 Claims**

1. An isolated arabinofuranosidase having the following characteristics:

(a) has a maximum activity at about pH 6.0;

(b) has a maximum activity at about 65° C.;

(c) maintains at least about 50% of its maximum activity at about 70° C. and pH 7 after 80 minutes;

(e) has an isoelectric point of about 4.4; and

(f) is obtainable from a strain of *Bacillus stearothermophilus* selected from the group consisting of *Bacillus stearothermophilus* NRRL B-18659, *Bacillus stearothermophilus* NRRL B-18660, and *Bacillus stearothermophilus* NRRL B-18661.

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**5,491,088**

**MONOCLONAL ANTIBODY BR 96 AND CHIMERIC MONOCLONAL ANTIBODIES HAVING THE VARIABLE REGION OF MAB BR96, WHICH BIND TO A VARIANT OF LEY ANTIGEN ON HUMAN CARCIMONA CELLS**

**Ingegerd Hellstrom; Karl E. Hellstrom; Kim F. Bruce, all of Seattle, and George J. Schreiber, Redmond, all of Wash., assignors to Oncogen Limited Partnership**

**Continuation of Ser. No. 544,246, Jun. 26, 1990, abandoned, which is a continuation-in-part of Ser. No. 374,947, Jun. 30, 1989, abandoned. This application May 5, 1993, Ser. No. 57,444**

**Int. Cl.[6] C12N** *5/20;* **C07K** *16/30*

**U.S. Cl. 435—240.24** **12 Claims**

1. Murine monoclonal antibody BR96 produced by the hybridoma HB10036 as deposited with the ATCC.

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**5,491,089**

**Patent Not Issued For This Number**

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**5,491,090**

**EMBRYOGENIC CONIFEROUS LIQUID SUSPENSION CULTURES**

**Levis W. Handley, III, Charleston, S.C., and Alice P. Godbey, Teaneck, N.J., assignors to Westvaco Corporation, New York, N.Y.**

**Continuation-in-part of Ser. No. 194,091, Feb. 9, 1994, abandoned. This application Feb. 21, 1995, Ser. No. 391,603**

**Int. Cl.[6] A01H** *4/00;7/00*

**U.S. Cl. 435—240.46** **26 Claims**

1. An improved method for establishing embryogenic liquid suspension cultures for use in somatic embryogenesis processes involving plants selected from the group consisting of *Pinus taeda, Pinus serotina, Pinus palustris, Pinus elliottii, Pinus rigida,* and hybrids thereof, which comprises:

(a) placing a suitable explant selected from the group consisting of immature zygotic embryos and megagametophytes containing immature zygotic embryos on culture initiation medium containing a sufficient amount of nutrients, 0.1 to 5.0 mg/l of auxin, 0.1 to 1.0 mg/l of cytokinin, 5.0 to 100.0 g/l of a sugar

selected from the group consisting of glucose, maltose, sucrose, melezitose, and combinations thereof, and a level of gelling agent selected from the group consisting of 2.5 to 4.5 g/l of agar, 0.5 to 1.5 g/l of gellan gum, 3.0 to 5.0 g/l of agarose, and 1.5 to 3.0 g/l of AGARGEL, for 2 to 14 weeks under suitable environmental conditions to grow a culture containing embryogenic tissue; and

(b) wherein the improvement comprises transferring the embryogenic tissue culture to liquid suspension culture maintenance medium containing a sufficient amount of nutrients, 0.1 to 100.0 mg/l of auxin, 0.05 to 10.0 mg/l of cytokinin, 5.0 to 100.0 g/l of a sugar selected from the group consisting of glucose, maltose, sucrose, melezitose, and combinations thereof, and about 0.1–10.0 g/l of activated carbon, for a sufficient time under suitable environmental conditions to establish a liquid embryogenic cell culture.

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**5,491,091**

**CONTACT LENS DISINFECTING SYSTEM**

**Samuel Loshaek, Chicago, Ill., and Helmut Singer, Pittsford, N.Y., assignors to Schering Corporation, Kenilworth, N.J.**

**PCT No. PCT/US90/04194, § 371 Date Jan. 28, 1992, § 102(e) Date Jan. 28, 1992, PCT Pub. No. WO91/01763, PCT Pub. Date Feb. 6, 1991**

**PCT Filed Jul. 31, 1990, Ser. No. 809,551**

**Int. Cl.[6] A61L *2/16***

**U.S. Cl. 436—1** **5 Claims**

1. A process for disinfecting a contact lens comprising:

(a) providing a fixed quantity of aqueous liquid;

(b) dissolving a unit dose of a solid composition in the aqueous liquid to form a disinfecting solution, said unit dose comprising:

(1) sufficient solid peroxide source to cause the disinfecting solution to have a concentration of 0.01 to less than 0.5 percent weight/volume hydrogen peroxide.

(2) solid carbonate or bicarbonate, and

(3) organic acid;

(c) contacting the lens with the disinfecting solution at room temperature for a time sufficient to disinfect the lens; and

(d) wearing the lens without neutralizing residual peroxide.

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**5,491,092**

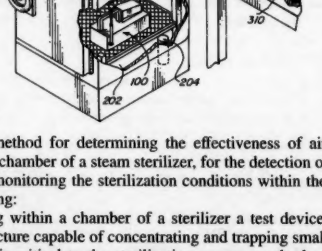
**STERILIZER TEST METHOD AND APPARATUS**

**Richard R. Colvin, Orchard Hill Rd., Katonah, N.Y. 10536**

**Continuation-in-part of Ser. No. 878,564, May 5, 1992, abandoned. This application Jun. 22, 1994, Ser. No. 263,801**

**Int. Cl.[6] G01N *30/54*; A61L *2/24***

**U.S. Cl. 436—1** **20 Claims**




1. A method for determining the effectiveness of air removal from the chamber of a steam sterilizer, for the detection of air leaks and for monitoring the sterilization conditions within the chamber comprising:

placing within a chamber of a sterilizer a test device having a structure capable of concentrating and trapping small amounts of air critical to the sterilization process to the location of a temperature sensor and sensing a temperature by means of the temperature sensor and generating a signal ($T_1$) indicative of the measured temperature, wherein said test device including wall members defining an elongated cavity with a predetermined length and cross section having an opening at one end of the cavity to permit the entrance of ambient gases, a temperature sensor capable of generating signal $T_1$ indicative of the temperature at its location at the end of the test cavity opposite from said opening and a heat sink capable of condensing steam disposed within the cavity between the opening and the temperature sensor to thereby concentrate any air present in the chamber in the direct vicinity of the temperature sensor, said heat sink comprising a material of a density, porosity and thermal conductivity effective to condense a sufficient amount of steam to cause air, if present, to collect at the end of the test device where the temperature sensor is located;

generating a signal $T_1$;

generating a signal ($T_r$) indicative of a reference temperature;

comparing signal $T_1$ to signal $T_r$; and

generating a signal indicative of either a pass or fail condition based on the results of the comparison.

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**5,491,093**

**QUANTITATIVE DETERMINATION OF LIPID, AND OF CO-EXISTING TWO COMPOUNDS**

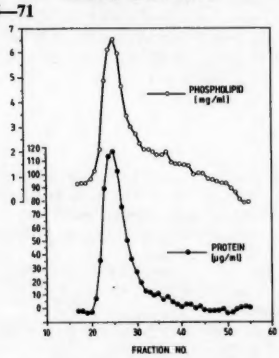
**Nobuko Yamamoto, Isehara; Yasuko Tomida, Atsugi; Junji Ohyama, Yamato; Tsuyoshi Nomoto, and Masahiro Kawaguchi, both of Atsugi, all of, Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan**

**Filed Sep. 9, 1992, Ser. No. 942,417**

**Claims priority, application Japan, Sep. 9, 1991, 3-228960; Sep. 9, 1991, 3-228961; Sep. 11, 1991, 3-231914**

**Int. Cl.[6] G01N *33/92***

**U.S. Cl. 436—71** **7 Claims**




1. A method for quantitative determination of lipid, consisting essentially of preparing a liquid sample dispersion by treating a sample with a surfactant in an aqueous medium, and measuring light absorbance of the liquid sample dispersion in an ultraviolet region.

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**5,491,094**

**TEST STRIP FOR FREE CHLORINE ANALYSIS**

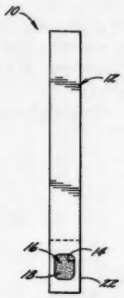
**Vasili V. Ramana; Kami R. Yamuna, and Ivars Jaunakais, all of Rock Hill, S.C., assignors to Industrial Test Systems, Inc., Rock Hill, S.C.**

**Filed Jun. 3, 1994, Ser. No. 253,959**

**Int. Cl.[6] G01N *33/00***

**U.S. Cl. 436—125** **20 Claims**

14. A method for analysis of free chlorine, said method comprising contacting an unknown sample with a test strip comprising a




carrier treated with a combined solution of an organic liquid-containing solution of 3,3',5,5'-tetraalkylbenzidine having C1–C3 alkyl groups, wherein said alkyl groups may be the same or different, and a water-containing solution comprising a buffer and effective to provide the treated carrier with a pH effective to prevent chloramine interference; and evaluating the coloration on said carrier.

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**5,491,095**

## SYSTEM AND METHOD FOR AGGULUTINATION DETECTION

**Stephen Bepko, Catonsville; Donald M. McIver, Laurel, and Francis J. Kaisler, Ellicott City, all of Md., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.**

**Filed May 26, 1993, Ser. No. 67,278**
**Int. Cl.[6] G01N** *33/546;33/557;33/94*
**U.S. Cl. 436—518** **6 Claims**

1. A method of determining the presence or absence of a target substance in a sample comprising:

combining the sample with agglutination reagents specific for the target substance to form a reaction mixture;

flowing the reaction mixture along a path having a predetermined width past a transparent read area;

illuminating the flowing mixture at the read area;

detecting in a direction from one side of the path to the other at a plurality of read area locations light received through the flowing mixture;

generating a series of signals for each of the plurality of read area locations having a value corresponding to the detected illumination;

calculating variations in the value of the signals at each read area during a predetermined time interval, wherein the step of calculating the variations in the signals comprises the substeps of passing each signal of each detector through a low pass filter equation

$$LP_i = K1 \text{ Input}_i + (1-K1)*LP_i - 1$$

and a high pass filter equation

$$HP_i = HP - 1 + \text{Input}_i - LP_i,$$

where

i is the current signal number,

$\text{Input}_i$ is the current input signal,

K1 is a filter constant between 0 and 1,

$LP_i$ is the current accumulated Low Pass filtered data, and

$HP_i$ is the current accumulated High Pass filtered data;

determining the absence of the target substance in the flowing mixture in response to the calculation of a predetermined number of calculated variations for each of a predetermined plurality of the read area locations; and

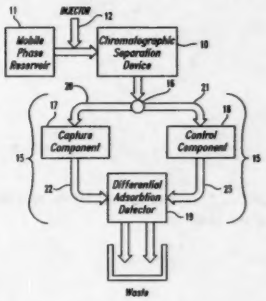
determining the presence of the target substance in the flowing mixture in response to calculation of less than the predetermined number of value variations during the predetermined time interval.

**5,491,096**

## ANTIGEN DETECTION WITH AFFINITY CHROMATOGRAPHY AND PARALLEL PROCESSING A CONTROL

**J. Richard Sportsman, Palo Alto, Calif., assignor to Eli Lilly and Company, Indianapolis, Ind.**

**Filed Dec. 27, 1993, Ser. No. 172,843**
**Int. Cl.[6] C01N** *33/543;33/546*
**U.S. Cl. 436—518** **12 Claims**




12. A device for determining the presence of an antigen of interest in a sample in a flow of eluant comprising:

(a) a chromatographic column;

(b) means for splitting the flow of eluant from said chromatographic column into at least a first stream and a second stream;

(c) a capture component including a first solid phase having immobilized thereon capture ligands that specifically bind the antigen of interest, said capture component coupled to said splitting means to accept a first stream of eluant flow from the splitting means;

(d) a control component including a second solid phase substantially identical to the first solid phase except lacking the immobilized capture ligands, said control component coupled to said splitting means to accept a second stream of eluant flow from the splitting means; and

(e) one or more detectors effective to determine differential binding of the suspected antigen by said capture component and said control component, said detectors coupled to said capture component to accept therefrom the stream of eluant exiting said capture component and coupled to said control component to accept therefrom the stream of eluant exiting said control component.

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**5,491,097**

## ANALYTE DETECTION WITH MULTILAYERED BIOELECTRONIC CONDUCTIVITY SENSORS

**Hans O. Ribi, Hillsborough; Todd Guion, San Mateo, and Paul T. Shafer, Campbell, all of Calif., assignors to Biocircuits Corporation, Sunnyvale, Calif.**

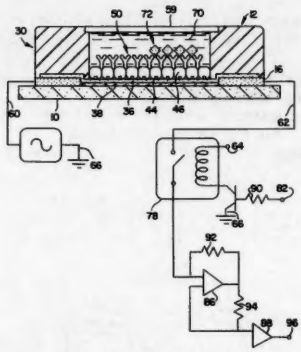
**Continuation of Ser. No. 893,563, Jun. 3, 1992, abandoned, which is a continuation of Ser. No. 453,784, Dec. 20, 1989, abandoned, which is a continuation-in-part of Ser. No. 366,651, Jun. 15, 1989, Pat. No. 5,156,810. This application Feb. 28, 1994, Ser. No. 203,846**
**Int. Cl.[6] G01N** *33/53*
**U.S. Cl. 436—518** **5 Claims**

1. A method for detecting an analyte in a sample with a bioelectronic sensor, said sensor comprising:

an electrically inert substrate;

an electrode array comprising a plurality of interdigitating parallel electrodes supported by said substrate, defining two sets of parallel electrodes, each of said sets having a common lead;

a surfactant layer comprising crystalline domains of an electrically conducting surfactant polymer in electrical contact with




said electrodes, said polymer formed by the polymerization of alkadiynes of the formula:

$$C_x(C{\equiv}C)_nC_yL\,M$$

wherein:

C intends carbon;

x and y are at least 1 and the sum of x and y is in the range of 4–32;

n is 2;

L is a bond or linking group; and

M is a specific binding member which specifically binds to said analyte;

with one terminus of each of said alkadiynes proximal to said substrate and the other terminus comprising said specific binding member, said polymerization occurring at the C≡C groups of said alkadiynes, wherein specific binding of said analyte to said specific binding member causes a change in the conductivity of said electrically conducting surfactant polymer;

insulating means proximal to said electrodes and leads for insulating said electrodes and leads from external contact with moisture; and

means for connecting said leads to an external circuit; said method consisting of:

contacting said sample with said bioelectronic sensor;

detecting the change in the conductivity of said electrically conducting polymer; and

relating said change to the presence of said analyte in said sample.

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**5,491,098**

## METHOD FOR DEPOSITING METAL PARTICLES ON A MARKER

**Marcus J. M. Noppe, Kalmthout, and Frank J. Konings, Antwerpen, both of, Belgium, assignors to Janssen Pharmaceutica N.V., Beerse, Belgium**

**Continuation of Ser. No. 956,449, Oct. 2, 1992, abandoned, which is a continuation of Ser. No. 696,283, Apr. 26, 1991, abandoned, which is a continuation of Ser. No. 161,828, Feb. 29, 1988, abandoned, which is a continuation-in-part of Ser. No. 23,733, Mar. 9, 1987, abandoned. This application Apr. 21, 1994, Ser. No. 231,948**

**Int. Cl.[6] G01N** *33/553*

**U.S. Cl. 436—525** **15 Claims**

1. A method for quantitatively or qualitatively determining one or more components of an aggregate formed between at least one specific binding agent and its corresponding bindable substance which comprises labelling at least one component of said aggregate with a marker and contacting said aggregate with a physical developer whereby under influence of the marker a metal particle is formed which can qualitatively or quantitatively be determined to provide a qualitative or quantitative indication of the component or components to be determined, characterized in that the physical developer used comprises: (a) a solution of metal ions wherein said metal ions are selected from the group consisting of silver, gold, platinum, palladium and thallium ions: (b) a molar excess relative to the metal ions of a complexant having one or more nitrogen donor atoms, wherein the complexant is histidine or imidazole; and (c) a reducing agent.

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**5,491,099**

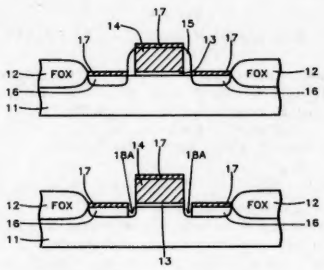
## METHOD OF MAKING SILICIDED LDD WITH RECESS IN SEMICONDUCTOR SUBSTRATE

**Chen-Chung Hsu, Taichung, Taiwan, Prov. of China, assignor to United Microelectronics Corporation, Hsinchu, Taiwan, Prov. of China**

**Filed Aug. 29, 1994, Ser. No. 297,497**

**Int. Cl.[6] H01L** *21/8234*

**U.S. Cl. 437—35** **18 Claims**




1. A method for fabricating a MOSFET device on a semiconductor substrate having device regions formed therein comprising:

forming field oxide regions for isolation of a device region on the surface of said substrate;

growing a gate oxide on said device region;

depositing a polysilicon layer over said field oxide regions and over said gate oxide;

patterning to form a polysilicon gate structure within said device region on said gate oxide;

depositing a first dielectric layer;

anisotropically etching said first dielectric layer to form spacer insulators on sides of said polysilicon gate structure;

ion implanting a first conductivity imparting dopant into said device regions and into said polysilicon gate;

annealing to form source and drain regions;

depositing a metal film on all exposed areas, including said field oxide, said source and drain regions, said space insulators and said polysilicon gate structure;

annealing to form metal silicide on said source and drain regions and on said polysilicon gate structure and unreacted metal in all other areas;

removal of said unreacted metal;

removal of said spacer insulators, exposing a non-silicided portion of said semiconductor substrate;

anisotropically etching said non-silicided substrate;

ion implanting a second conductivity imparting dopant;

growing a thermal oxide; and

depositing a second dielectric layer.

**5,491,100**

## METHOD FOR MANUFACTURING A SEMICONDUCTOR DEVICE HAVING A CONTACT WINDOW STRUCTURE

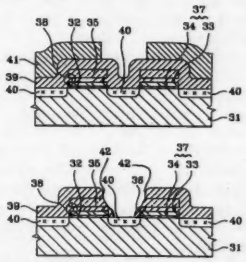
**Yong H. Lee, Seoul, and Young W. Seo, Kyungki-do, both of, Rep. of Korea, assignors to Samsung Electronics Co., Ltd., Suwon, Rep. of Korea**

**Filed Nov. 23, 1993, Ser. No. 155,745**

**Claims priority, application Rep. of Korea, Nov. 23, 1992, 92-22040**

**Int. Cl.[6] H01L** *21/336*

**U.S. Cl. 437—41** **10 Claims**




1. A method for manufacturing a gate structure of a semiconductor device comprising the steps of:

forming a gate insulating layer on a semiconductor substrate;

forming a first conductive layer of polycrystalline silicon on said gate insulating layer;

forming a second conductive layer of refractory metal silicide on said first conductive layer;

forming a first insulating layer on said second conductive layer;

forming a first photoresist pattern on said first insulating layer;

forming a gate structure in said first insulating layer, said second conductive layer, and said first conductor layer by removing an exposed portion of said first insulating layer, said second conductive layer, and said first conductive layer using said first photoresist pattern as a mask, said second conductive layer of said gate structure having a recessed edge portion with respect to an edge portion of said first insulating layer and an edge portion of said first conductive layer.

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**5,491,101**

## MANUFACTURING METHOD OF NON-VOLATILE SEMICONDUCTOR MEMORY DEVICES

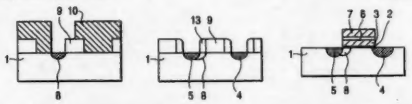
**Kyoko Miyamoto, Kyoto, and Fumihiko Noro, Osaka, both of, Japan, assignors to Matsushita Electronics Company, Osaka, Japan**

**Filed Nov. 25, 1994, Ser. No. 348,100**

**Claims priority, application Japan, Nov. 25, 1993, 5-295152**

**Int. Cl.[6] H01L** *21/8247*

**U.S. Cl. 437—43** **3 Claims**




1. Manufacturing method of a non-volatile semiconductor memory device, featuring in that it comprises:

a process to form on a semiconductor substrate of a conductive type a first insulation layer having two openings so that the semiconductor substrate is exposed and the first insulation layer having two edges in each opening;

a process to mask one of said two openings and a portion of the other opening with photoresist;

a process to form in said semiconductor substrate a first diffusion layer of the same conductive type as said semiconductor substrate, with said first insulation layer and said photoresist as masks;

a process to remove said photoresist;

a process to form a side wall layer alongside each edge of said first insulation layer in said two openings;

a process to form in said semiconductor substrate second and third diffusion layers, having a conductive type opposite to that of said semiconductor substrate, through said two openings, with said first insulation layer and the side wall layers as masks;

a process to remove said first insulation layer and the side wall layers;

a process to form a second insulation layer on a channel region distinguished by, and including part of, said second and third diffusion layers on said semiconductor substrate;

a process to form a floating-gate electrode on said second insulation layer;

a process to form a third insulation layer on said floating-gate electrode; and

a process to form a control-gate electrode on said third insulation layer.

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**5,491,102**

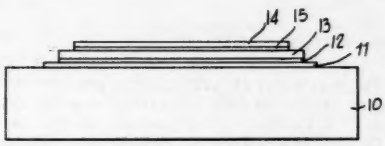
## METHOD OF FORMING MULTILAYERED ELECTRODES FOR FERROELECTRIC DEVICES CONSISTING OF CONDUCTIVE LAYERS AND INTERLAYERS FORMED BY CHEMICAL REACTION

**Seshu B. Desu; In K. Yoo; Chi K. Kwok, and Dilip P. Vijay, all of Blacksburg, Va., assignors to Ceram Incorporated; Sharp Kabushiki Kaisha, and Virginia Polytechnic Institute and State University**

**Division of Ser. No. 868,045, Apr. 13, 1992, abandoned. This application Aug. 10, 1993, Ser. No. 104,861**

**Int. Cl.[6] H01L** *21/70;27/00*

**U.S. Cl. 437—52** **8 Claims**




1. A method of making a ferroelectric device comprising the steps of:

a) depositing a conducting oxide on a substrate to provide a ceramic electrode;

b) depositing a layer of ferroelectric material on said ceramic electrode to produce an interface between the ferroelectric layer and the ceramic electrode;

c) annealing said electrode and said ferroelectric layer to react the conducting oxide with the ferroelectric layer to produce a conductive interlayer at the interface; and

d) depositing a conductive top electrode over said layer of ferroelectric material.

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**5,491,103**

## METHOD FOR MANUFACTURING A CAPACITOR STRUCTURE OF A SEMICONDUCTOR MEMORY DEVICE

**Tae-hyuk Ahn, Ansan; In-ho Nam, Daegu, and Joo-young Yoon, Seoul, all of, Rep. of Korea, assignors to Samsung Electronics Co., Ltd., Suwon, Rep. of Korea**

**Filed Apr. 8, 1994, Ser. No. 225,287**

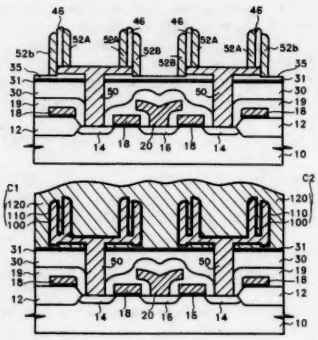
**Claims priority, application Rep. of Korea, Apr. 8, 1993, 93-5901**

**Int. Cl.[6] H01L** *21/70;27/00*

**U.S. Cl. 437—52** **26 Claims**

7. A method for manufacturing a capacitor structure of an integrated semiconductor memory device comprising the steps of:

forming a first conductive layer on a semiconductor substrate;



forming a first material layer and a second material layer sequentially on said first conductive layer;

patterning said second material layer to thereby form a first pattern;

forming a third material layer on the resultant structure whereon said first pattern is formed;

etching said third material layer anisotropically to thereby form a spacer on the side of said first pattern, and etching said first material layer simultaneously;

etching said first conductive layer using said spacer as an etch-mask;

removing said first pattern and said first material layer;

forming a second conductive layer on the resultant structure;

etching said second conductive layer anisotropically; and

removing said spacer to thereby form a storage electrode of a capacitor.

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**5,491,104**

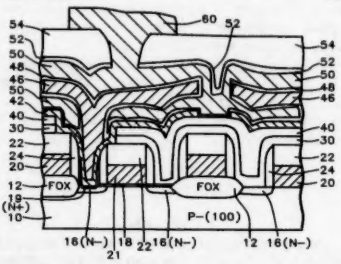
**METHOD FOR FABRICATING DRAM CELLS HAVING FIN-TYPE STACKED STORAGE CAPACITORS**

**William W. Y. Lee; Meng-Jaw Cherng, and Ing-Ruey Liaw, all of Hsinchu, Taiwan, Prov. of China, assignors to Industrial Technology Research Institute, Hsinchu, Taiwan, Prov. of China**

**Filed Sep. 30, 1994, Ser. No. 315,555**

**Int. Cl.[6] H01L** *21/70;27/00*

**U.S. Cl. 437—52** **23 Claims**



**15**. A method for fabricating a stacked storage capacitor on a semiconductor substrate having device areas formed thereon comprising the steps of:

providing a semiconductor substrate having field oxide areas while leaving device areas with semiconductor devices and device contacts therein;

forming a substrate insulating layer on said substrate and forming thereon said stacked storage capacitor by,

etching contact openings in said substrate insulating layer exposing said device contact,

conformally depositing a first bottom electrode polysilicon layer on said substrate without filling said contact openings to said source/drain regions, and thereby making electrical contact by out diffusing dopants from said first bottom electrode polysilicon layer to said device contacts,

depositing a sacrificial oxide layer on said first bottom electrode polysilicon layer,

masking and etching contact openings in said sacrificial oxide layer exposing said first bottom electrode polysilicon layer only and directly over said device areas,

depositing a second bottom electrode polysilicon layer on said sacrificial oxide layer and making electrical contact to said first bottom electrode polysilicon layer through said contact openings in said sacrificial oxide layer, and wherein said second bottom electrode polysilicon layer fills said contact openings in said sacrificial oxide layer,

patterning and etching said second bottom electrode polysilicon layer over said sacrificial oxide layer and leaving portions over said device areas,

etching isotropically and removing said sacrificial oxide layer completely from said substrate,

patterning by anisotropic etching said first bottom electrode polysilicon layer, leaving portion under and aligned to said patterned second bottom electrode polysilicon layer, thereby forming fin shaped bottom capacitor electrodes,

forming a capacitor dielectric layer on a surface of said bottom capacitor electrodes,

depositing a top electrode polysilicon layer and forming a top capacitor electrode, and thereby completing said stacked storage capacitors making electrical contact to said semiconductor device contacts.

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**5,491,105**

**LDMOS TRANSISTOR WITH SELF-ALIGNED SOURCE/BACKGATE AND PHOTO-ALIGNED GATE**

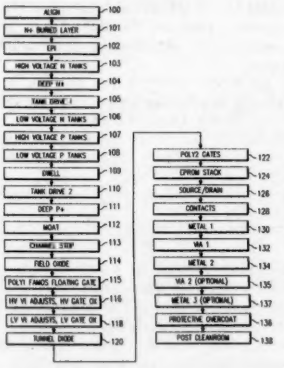
**Michael C. Smayling, Missouri City; Manuel L. Torreno, Jr., deceased, late of Houston, both of Tex., and Georges Falessi, La Gaude, France, assignors to Texas Instruments Incorporated**

**Continuation of Ser. No. 71,156, Jun. 2, 1993, Pat. No. 5,348,895, which is a continuation of Ser. No. 857,360, Mar. 25, 1992, Pat. No. 5,242,841. This application Sep. 9, 1994, Ser. No. 303,792**

**The portion of the term of this patent subsequent to Sep. 20, 2011, has been disclaimed.**

**Int. Cl.[6] H01L** *21/822*

**U.S. Cl. 437—54** **9 Claims**



**1**. A method of forming a circuit device in a semiconductor layer comprising the steps of:

exposing a region of said semiconductor layer;

implanting p-type dopants into each said exposed region of said semiconductor layer, said p-type dopants having a first diffusion rate;

implanting n-type dopants into said exposed region of said semiconductor layer, said n-type dopants having a second diffusion rate, said second diffusion rate different than said first diffusion rate; and

heating said exposed region such that a first doped region is formed within a second doped region wherein said first doped region is doped with dopants of a first conductivity type and said second doped region is doped with dopants of a second conductivity type, said first conductivity type being different than said second conductivity type;

wherein said circuit device comprises a D-well region of a lateral DMOS device which includes a source and a backgate, wherein said first doped region comprises said source and said second doped region comprises said backgate.

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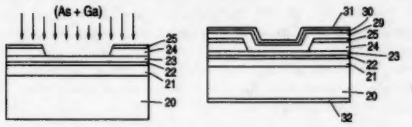
**5,491,106**

## METHOD FOR GROWING A COMPOUND SEMICONDUCTOR AND A METHOD FOR PRODUCING A SEMICONDUCTOR LASER

**Akinori Seki, Toyota; Hiroyuki Hosoba, Nara; Toshio Hata, Nara; Masafumi Kondo, Nara; Takahiro Suyama, Yamatokoriyama, and Sadayoshi Matsui, Tenri, all of, Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan**

**Continuation of Ser. No. 798,669, Nov. 26, 1991, abandoned.**
**This application Jul. 23, 1993, Ser. No. 97,316**
**Claims priority, application Japan, Nov. 26, 1990, 2-324347**
**Int. Cl.[6] H01L** *21/20;21/302*
**U.S. Cl. 437—107** **7 Claims**




1. A method for growing a compound semiconductor layer of $Al_xGa_{1-x}As$ ($0 \leqq x \leqq 1$) on a compound semiconductor substrate by the use of a molecular beam epitaxial apparatus, comprising the steps of:

providing the substrate having a GaAS layer on an upper surface thereof;

thermally etching the GaAs layer by heating the substrate at a temperature and by irradiating the GaAs layer with a gallium molecular beam and an arsenic molecular beam so as to expose the upper surface of the substrate; and

growing the $Al_xGa_{1-x}As$ ($0 \leqq x \leqq 1$) layer on the upper surface of the substrate.

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**5,491,107**

## SEMICONDUCTOR PROCESSING METHOD FOR PROVIDING LARGE GRAIN POLYSILICON FILMS

**Charles L. Turner, and Monte Manning, both of Boise, Id., assignors to Micron Technology, Inc., Boise, Id.**

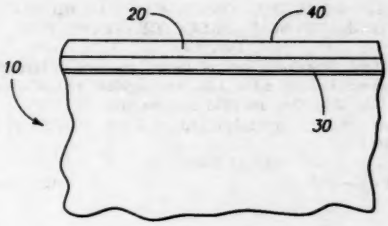
**Continuation of Ser. No. 7,546, Jan. 21, 1993, abandoned.**
**This application Apr. 21, 1995, Ser. No. 426,639**
**Int. Cl.[6] H01L** *21/22*
**U.S. Cl. 437—162** **16 Claims**

1. A semiconductor processing method of providing a polysilicon thin film transistor layer atop a semiconductor wafer comprising the following sequential steps:

depositing a first layer of arsenic atop a semiconductor wafer;

depositing a second layer of silicon over the arsenic layer, the second layer having an outer surface;

first annealing the wafer at a temperature of at least about 550° C. for a time period sufficient to impart growth of polycrystalline silicon grains in the second layer and providing a predominately polysilicon second layer, the first annealing step imparting diffusion of arsenic within the second layer to promote size growth of individual polysilicon grains; and




with the second layer outer surface being outwardly exposed, outgassing arsenic from the polysilicon layer.

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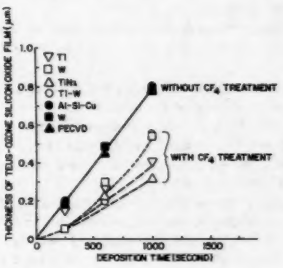
**5,491,108**

## METHOD OF PRODUCING SEMICONDUCTOR INTEGRATED CIRCUIT DEVICE HAVING INTERPLAYER INSULATING FILM COVERING SUBSTRATE

**Mieko Suzuki; Tetsuya Homma; Yukinobu Murao; Takaho Tanigawa, and Hiroki Koga, all of Tokyo, Japan, assignors to NEC Corporation, Tokyo, Japan**

**Filed Dec. 10, 1993, Ser. No. 164,580**
**Claims priority, application Japan, Jun. 8, 1993, 5-137215**
**Int. Cl.[6] H01L** *21/44*
**U.S. Cl. 437—192** **6 Claims**




1. A method of fabricating a semiconductor integrated circuit device comprising the steps of:

covering a semiconductor substrate with a first insulating film;

selectively forming a first conductive layer on said first insulating film, said first conductive layer having a top layer containing at least one of titanium and tungsten;

combining fluorine with said at least one of titanium and tungsten on a surface portion of said top layer of said first conductive layer; and

depositing, by means of chemical vapor deposition using an organic silicon compound and ozone, a silicon oxide film on a surface of said first insulating film and on said surface portion of said top layer of said first conductive layer, wherein said first conductive layer has fluorine combined with said at least one of titanium and tungsten on said surface portion of said top layer during said depositing step.

5,491,109

## METHOD FOR THE CONSTRUCTION OF HIGHLY INTEGRATED SEMICONDUCTOR CONNECTING DEVICE

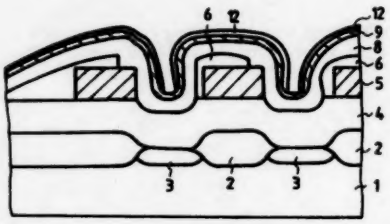
Jae G. Kim, Bubaleub, Rep. of Korea, assignor to Hyundai Electronics Industries Co., Ltd., Kyoungkido, Rep. of Korea

Filed Dec. 16, 1993, Ser. No. 168,539

Claims priority, application Rep. of Korea, Dec. 16, 1992, 1992/24501

Int. Cl.[6] H01L *21/44*

U.S. Cl. 437—195 12 Claims




1. A method for constructing a highly integrated connecting device, comprising the steps of:

forming a sacrificial insulating film over a structure comprising a plurality of spaced-apart second conductive lines formed on a first interlayer insulating film overlaying a semiconductor substrate sectioned into active regions having a plurality of first conductive lines and device separation regions, said plurality of spaced-apart second conductive lines resulting from the etch of a conductive material deposited on said first interlayer insulating film;

etching said sacrificial insulating film and said first interlayer insulating film atop said first conductive lines by use of a mask in such a range that a plurality of said first conductive lines are not damaged;

forming a second interlayer insulating film to insulate said spaced-apart second conductive lines which are exposed by said etch;

depositing a silicon film, a diffusing barrier nitride film and an etching barrier spin-on-source film, in due order;

applying an etch back to said spin-on-source film so that said spin-on-source film remains on only said nitride film formed between said second conductive lines, said nitride film being exposed at other portions;

subjecting said exposed portions of said nitride film to the treatment of etching so that said nitride film remains on only said silicon film formed between said second conductive lines, by use of said remaining spin-on-source film as an etching barrier material;

removing said spin-on-source film;

growing a thermal oxide film on exposed portions of said silicon film;

eliminating said remaining diffusing barrier nitride film from said silicon film to partially expose said silicon film;

etching the exposed part of said silicon film by use of said thermal oxide film as an etch barrier material so as to expose said second interlayer insulating film atop said first interlayer insulating film;

applying an etch to said exposed second interlayer insulating film and said first interlayer insulating film by use of said resulting silicon film as an etching barrier material so as to form contact holes on said first conductive lines;

depositing a conductive material to form electrode contacts on said first conductive lines, respectively, said electrode contacts passing by said second conductive lines; and

etching said conductive material in a pattern to form third conductive lines which are connected with said first conductive lines and insulated from said second conductive lines.

5,491,110

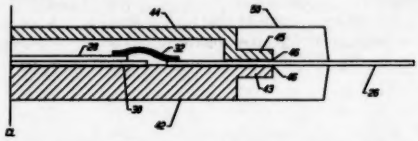
## METAL SEMICONDUCTOR PACKAGE WITH AN EXTERNAL PLASTIC SEAL

Gerald K. Fehr, Cupertino, and Victor Batinovich, Morgan Hill, both of Calif., assignors to Integrated Packaging Assembly Corporation, San Jose, Calif.

Division of Ser. No. 258,967, Jun. 13, 1994, Pat. No. 5,436,407. This application Feb. 3, 1995, Ser. No. 383,716

Int. Cl.[6] H01L *21/60*

U.S. Cl. 437—206 13 Claims




1. A method of forming a semiconductor package, said method comprising the steps of:

providing a lead frame with a top surface and a bottom surface;

affixing a semiconductor die to said top surface of said lead frame;

connecting bond wires between said semiconductor die and said lead frame;

positioning a metallic base member adjacent to said bottom surface of said lead frame to allow an adhesive to directly couple said metallic base member to said bottom surface of said lead frame;

placing a metallic cap member on top of said top surface of said lead frame to allow an adhesive to directly couple said metallic cap member to said top surface of said lead frame, said metallic cap member defining a cavity over said semiconductor die; and

sealing, after said placing step, said lead frame between said metallic base member and said metallic cap member with an external plastic seal.

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5,491,111

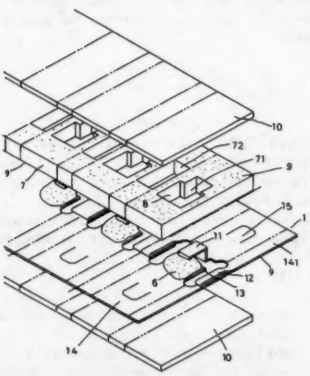
## METHOD OF MAKING A SEMICONDUCTOR DIODE

George Tai, 14th Fl., No. 133, Sec. 1, Pei Hsin Rd., Hsin Tien City, Taipei Hsien, Taiwan, Prov. of China

Filed Oct. 26, 1994, Ser. No. 330,064

Int. Cl.[6] H01L *21/60*

U.S. Cl. 437—209 12 Claims




1. A method of making a semiconductor diode comprising the steps of:

i) stamping a sheet form metal to form a jumper electrode having a soldering tip, a bottom electrode and connecting strips between said jumper electrode and said bottom electrode, then bending said connecting sections to move the soldering tip of said jumper electrode above said bottom

electrode, and then placing a diode chip in between said soldering tip and said bottom electrode;

ii) melting pre-attached solders on said diode chip to bond said chip to said soldering tip of said jumper electrode as well as said bottom electrode to form electrical connections;

iii) chemically etching said diode chip by an etchant, then oxidizing said diode chip by an oxidizer, and then protecting said diode chip with a P-N junction protection material and curing it by heating;

iv) filling a sealing resin in the diode chip cavity of a multi-layer substrate board and then applying the surface of said substrate board with a bonding agent, then placing said sub-assembly of diode chip and conductor element on said substrate board with said jumper electrode inserted into said diode chip cavity, and then bending said conductor element to form two opposite terminals;

v) applying a layer of bonding agent over said cover lid, then fastening said cover lid to said conductor element, by bending up the fastening fingers of said conductor element to let said cover lid by firmly retained to said conductor element, and then curing said boding agent and said sealing resin by heating in an electric heating oven; and

vi) testing the electric parameters of said diode units by an electric parameter testing apparatus and cutting a positive pole identification cut, and then separating individual diode units thus made and packing them individually by an automatic packing machine.

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**5,491,112**

## METHOD AND ARRANGEMENT FOR TREATING SILICON PLATES

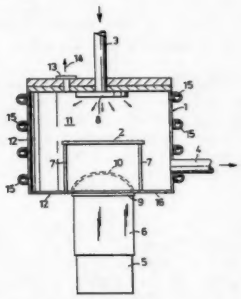
**Rudolf Buchta, Österskär, and Yngve Hässler, Lindingö, both of, Sweden, assignors to Im Institutet För Mikroelektronik, Kista, Sweden**

**Continuation of Ser. No. 781,139, Dec. 26, 1991, abandoned. This application Nov. 19, 1993, Ser. No. 155,154**

**Claims priority, application Sweden, Jun. 30, 1989, 8902391**

**Int. Cl.[6] H01L** *21/302*

**U.S. Cl. 437—225** **16 Claims**



1. A method for treating a silicon plate in a reactor during chemical vapor deposition, for the purpose, inter alia, of depositing substances on the silicon plate by introducing different gases into the reactor, said method comprising the steps of:

a. providing a cold-wall reactor defining a microwave cavity having cooled cavity-defining walls and having a gas inlet;

b. providing a microwave generator and a waveguide for introducing microwaves into the microwave cavity;

c. positioning a substrate holder within the microwave cavity and spaced from the waveguide, wherein the substrate holder is made from a material that has a low loss factor;

d. placing on the substrate holder a silicon plate onto which substances are to be deposited; and

e. introducing microwave energy into the reactor microwave cavity from the microwave generator to heat the silicon plate to a desired temperature.

**5,491,113**

## METHOD OF MANUFACTURING SEMICONDUCTOR DEVICE HAVING A PLANARIZED SURFACE

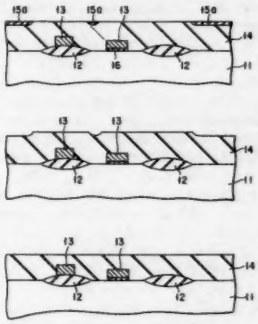
**Masayuki Murota, Yokohama, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan**

**Filed Mar. 8, 1995, Ser. No. 401,063**

**Claims priority, application Japan, Mar. 10, 1994, 6-039592**

**Int. Cl.[6] H01L** *21/302;21/463*

**U.S. Cl. 437—225** **3 Claims**



1. A method of manufacturing a semiconductor device, comprising the steps of:

forming an interlayer insulating film along a surface of a semiconductor substrate having a stepped surface;

forming a stopper film at least at a recess portion in said interlayer insulating film;

polishing said interlayer insulating film and said stopper film until said interlayer insulating film and said stopper film are exposed on the same plane;

etching and removing said stopper film remaining after said polishing step; and then

polishing and flattening said interlayer insulating film.

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**5,491,114**

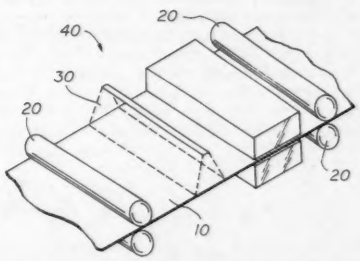
## METHOD OF MAKING LARGE-AREA SEMICONDUCTOR THIN FILMS FORMED AT LOW TEMPERATURE USING NANOCRYSTAL PRESURSORS

**Avery N. Goldstein, Midland, Mich., assignor to Starfire Electronic Development & Marketing, Ltd., Bloomfield Hills, Mich.**

**Filed Mar. 24, 1994, Ser. No. 217,162**

**Int. Cl.[6] H01L** *21/20*

**U.S. Cl. 437—233** **19 Claims**



1. The method of forming a continuous thin film of a semiconductor material onto a substrate, comprising the steps of:

providing a sheet of a substrate material;

tensioning the sheet;

applying a continuous layer of nanocrystals of the semiconductor material;

heating the layer of nanocrystals at a temperature below that of the bulk melting temperature, but which is nonetheless

adequate to melt the nanocrystals and cause them to fuse into a continuous thin film; and

cooling the thin film to form a solid.

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## 5,491,115
## COLORED GLASS-CERAMICS AND METHOD

**Robert W. Pfitzenmaier, Canisteo, and Charles C. Smith, Jr., Corning, both of N.Y., assignors to Corning Incorporated, Corning, N.Y.**

**Filed Jul. 18, 1994, Ser. No. 276,307**
**Int. Cl.[6] C03C** *10/14;10/12*
**U.S. Cl. 501—4** **14 Claims**

7. A colored glass-ceramic having a primary crystal phase selected from the group consisting of beta-quart solid solution and beta-spodumene solid solution, the glass-ceramic being transparent or opaque depending on the primary crystal phase, the glass-ceramic being transparent having a color defined by the color coordinates x=0.2200–0.3100, y=0.0200–0.2400 falling within the color box ABCDA in FIG. **1** in the drawings, when the primary crystal phase is a beta-quartz solid solution, and the glass-ceramic being opaque and having a color defined by the color coordinates x=0.2480–0.2880, y=0.2000–0.3150 falling within color box JKLMJ in FIG. **2** in the drawings when the primary crystal phase is a beta-spodumene solid solution, the glass-ceramic consisting essentially of, as calculated in weight percent on an oxide basis:

| | | | |
|---|---|---|---|
| $SiO_2$ | 65–70 | SrO | 0–1.4 |
| $Al_2O_3$ | 18–19.8 | BaO + SrO | 0.4–1.4 |
| $Li_2O$ | 2.5–3.8 | $As_2O_3$ | 0–1.5 |
| MgO | 0.5–1.5 | $Sb_2O_3$ | 0–1.5 |
| ZnO | 1.2–2.8 | $As_2O_3 + Sb_2O_3$ | 0.5–1.5 |
| $TiO_2$ | 1.8–3.2 | $Na_2O + K_2O$ | 0–<1.0 |
| $ZrO_2$ | 1.0–2.5 | $CO_3O_4$ | 600–3000 ppm |
| BaO | 0–1.4 | $Fe_2O_3$ | 700–900 ppm. |

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## 5,491,116
## FINE-GRAINED GLASS-CERAMICS

**George H. Beall, Big Flats, and Linda R. Pinckney, Corning, both of N.Y., assignors to Corning Incorporated, Corning, N.Y.**

**Filed Apr. 3, 1995, Ser. No. 415,791**
**Int. Cl.[6] C03C** *10/04*
**U.S. Cl. 501—5** **24 Claims**

1. A glass-ceramic article exhibiting an MOR of at least about 15,000 psi, a Knoop hardness value of greater than at least about 760 KHN, a Young's modulus about $20\times10^6$ psi and a fracture toughness in excess of 1.0 $MPa.m^{1/2}$, wherein the crystal phase assemblage is comprised predominately of magnesium containing crystals having a pyroxene structure represented by the formula $(M_2)(M_1)Si_2O_6$ where $M_2$ has a coordination of 6–8 oxygen atoms and $M_1$ is octahedrally coordinated and spinel crystals which are uniformly dispersed within a highly siliceous residual glass matrix phase, the article having an overall composition at least 92 % of which consists essentially, expressed in terms of weight percent on the oxide basis, of 35–60% $SiO_2$, 10–30% $Al_2O_3$, 12–30% MgO, 0–10% ZnO, 5–20% $TiO_2$, and 0–8% NiO.

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## 5,491,117
## OPTICAL FILTER GLASSES

**David J. Kerko, and Brent M. Wedding, both of Corning, N.Y., assignors to Corning Incorporated, Corning, N.Y.**

**Filed Jan. 23, 1995, Ser. No. 376,797**
**Int. Cl.[6] C03C** *4/08*
**U.S. Cl. 501—13** **2 Claims**

1. A silver halide-containing glass article essentially free from silver halide crystals exhibiting a bright yellow coloration which strongly attenuates the transmission of ultraviolet radiation and radiation having a wavelength up to about 450 nm, said article having an integral reduced surface layer thereon, the depth of that layer being sufficient to effectively prevent the transmission therethrough of ultraviolet radiation and radiation having a wavelength up to about 450 nm wherein said glass article consists essentially, expressed in terms of weight percent, of 0–2.5% $Li_2O$, 0–9% $Na_2O$, 0–17% $K_2O$, 0–6% $Cs_2O$, 8–20% $Li_2O+Na_2O+K_2O+Cs_2O$, 14–23% $B_2O_3$, 5–25% $Al_2O_3$, 0–25% $P_2O_5$, 20–65% $SiO_2$, 0.004–0.02% CuO, 0.15–0.3% Ag, 0.1–0.25% Cl, and 0.1–0.2% Br, wherein the molar ratio alkali metal oxides:$B_2O_3$ ranges about 0.55–0.85 and the weight ratio Ag:(Cl+Br) ranges about 0.65–0.95.

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## 5,491,118
## CADMIUM-FREE AND LEAD-FREE THICK FILM PASTE COMPOSITION

**Jacob Hormadaly, Omer, Israel, assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Filed Dec. 20, 1994, Ser. No. 359,768**
**Int. Cl.[6] C03C** *14/00*
**U.S. Cl. 501—20** **9 Claims**

1. A thick film paste composition suitable for forming resistor or thermistor patterns on a substrate comprising by weight %, basis solids (a) 5– 65% wt. ruthenium-based conductive materials; (b) 95– 35% wt. glass composition consisting essentially of by mole % 5–70% $Bi_2O_3$, 18–35% $SiO_2$, 0.1–40% CuO, 5–25% ZnO, 0.5–40% CoO, 0.5–40

$Fe_2O_3$, and 0.5–40% MnO, wherein the glass composition is free of lead and cadmium; and, all of (a) and (b) dispersed in an organic medium.

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## 5,491,119
## ZEOLITE L

**Johannes P. Verduijn, Spijkenisse, Netherlands, assignor to Exxon Chemical Patents Inc., Houston, Tex.**

**PCT No. PCT/US90/06306, § 371 Date Jun. 30, 1992, § 102(e) Date Jun. 30, 1992, PCT Pub. No. WO91/06367, PCT Pub. Date May 16, 1991**
**PCT Filed Oct. 30, 1990, Ser. No. 855,017**
**Claims priority, application United Kingdom, Jan. 30, 1989, 8924410**
**Int. Cl.[6] B01J** *29/30;* **C01B** *33/34;* **C07C** *2/76*
**U.S. Cl. 502—74** **30 Claims**

1. A Crystalline type L Zeolite L in which the crystals are cylindrical and have an average length of 0.6 microns or less and an average length:diameter ratio of less than 0.2 and have substantially flat basal planes.

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## 5,491,120
## OXIDATION CATALYST WITH BULK CERIA, A SECOND BULK METAL OXIDE, AND PLATINUM

**Kenneth E. Voss, Somerville; Bulent O. Yavuz, Plainfield; Robert J. Farrauto, Westfield, and Michael P. Galligan, Clark, all of N.J., assignors to Engelhard Corporation, Iselin, N.J.**

**Continuation of Ser. No. 973,462, Nov. 19, 1992, abandoned, which is a continuation-in-part of Ser. No. 798,437, Nov. 26, 1991, abandoned. This application May 23, 1994, Ser. No. 247,531**
**The portion of the term of this patent subsequent to Oct. 31, 2012, has been disclaimed.**
**Int. Cl.[6] B01J** *23/63;23/42;21/06;21/04*
**U.S. Cl. 502—304** **23 Claims**

1. An oxidation catalyst composition comprises a refractory carrier on which is disposed a coating of a catalytic material having a BET surface area of at least about 10 $m^2/g$ and consisting essentially of a combination of bulk ceria having a BET surface area of at least about 10 $m^2/g$ and a bulk second metal oxide

selected from the group consisting of one or more of titania, zirconia, ceria-zirconia, silica, alumina-silica, and α-alumina and from about 0.1 to 0.5 g/ft$^3$ of platinum dispersed on the catalytic material.

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**5,491,121**

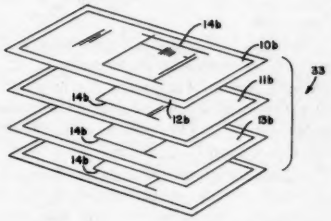
## ENVIRONMENTALLY FRIENDLY COLOR-CODED FORMS AND METHOD FOR CREATING SAME

**Ron Kuchta, 1219 Elizabeth, Naperville, Ill. 60540**

**Filed Nov. 17, 1993, Ser. No. 154,287**

**Int. Cl.$^6$ B41M** *5/00*

**U.S. Cl. 503—200** **12 Claims**




1. An array of color-coded papers capable of being collected with white paper and recycled without further separation after use, said array comprising, in combination, plural individual groups of paper sheets, with each individual group comprising plural individual sheets of paper, and with each sheet in a given group being color coded such that each group is distinguishable by color from other groups in said array, and is able to be divided or classified in use by said visible color code feature, and wherein said color code of each sheet appears on at least one face of each of said sheets, in a color code area of said sheet face, said color being applied thereto using a printing ink comprising an oil-based vehicle component and a dye-free pigment component, at least said pigment component being dispersible in a water-surfactant mix used in recycling and separable from the paper fibers created by said recycling, whereby said color-coded sheets can be recycled with white paper without imparting the color from the printing ink pigment to the recycled paper.

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**5,491,122**

## FUNGICIDAL AND INSECTICIDAL COMPOUNDS AND COMPOSITIONS DERIVED FROM FUNGAL STRAINS OF *PRENOPHORA TERES*

**Denise C. Manker, Davis, Calif.; Connie N. Rosendahl, Bromdby, Denmark; Morten Heide, Holte, Denmark; Torben L. Bachmann, Valby, Denmark, and Ruby I. Nielsen, Farum, Denmark, assignors to Novo Nordisk A/S, Bagsvaerd, Denmark, and Novo Nordisk Entotech, Inc., Davis, Calif.**

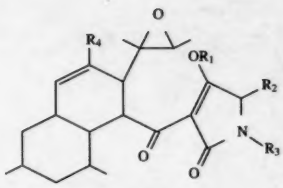
**PCT No. PCT/US93/05878, § 371 Date Dec. 7, 1994, § 102(e) Date Dec. 7, 1994, PCT Pub. No. WO94/00013, PCT Pub. Date Jan. 6, 1994**

**Continuation-in-part of Ser. No. 901,369, Jun. 19, 1992, abandoned. This PCT application Jun. 18, 1993, Ser. No. 351,275**

**Int. Cl.$^6$ A01N** *43/36;* **C07D** *207/44;405/10*

**U.S. Cl. 504—100** **18 Claims**

3. A compound of formula I or a tautomer thereof:




I

wherein

$R_1$ is hydrogen, methyl or acetyl, or $R_1$ is sodium, potassium, lithium or any other agriculturally-acceptable salt;

$R_2$ is hydrogen or straight or branched $C_{1-10}$-alkyl;

$R_3$ is hydrogen or straight or branched $C_{1-10}$-alkyl; and

$R_4$ is hydrogen or methyl.

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**5,491,123**

## HERBICIDES CONTAINING 3-AMINOBENZO(B)THIOPHENES AS ANTIDOTES

**Helmut Hagen, Frankenthal; Gerhard Nilz, Dannstadt-Schauernheim; Thomas Roetsch, Ludwigshafen; Helmut Walter, Obrigheim, and Andreas Landes, Limburgerhof, all of, Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Germany**

**PCT No. PCT/EP92/01798, § 371 Date Feb. 4, 1994, § 102(e) Date Feb. 4, 1994, PCT Pub. No. WO93/04057, PCT Pub. Date Mar. 4, 1993**

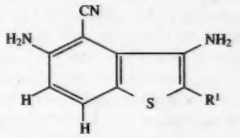
**PCT Filed Aug. 7, 1992, Ser. No. 193,073**

**Claims priority, application Germany, Aug. 16, 1991, 41 26 999.3**

**Int. Cl.$^6$ A01N** *25/32;43/12*

**U.S. Cl. 504—104** **8 Claims**

1. A herbicide containing one or more antagonistic 3-aminobenzo[b]-thiophenes of the formula I'




I'

where

$R^1$ is —COX or —COOX,

X is hydrogen, halogen, amino which may be unsubstituted or may carry from one to three substituents selected from the group consisting of $C_1$–$C_4$-alkyl, hydroxy-$C_1$–$C_4$-alkyl, phenyl and benzyl substituents,

$C_1$–$C_{10}$-alkyl, $C_2$–$C_8$-alkenyl, $C_3$–$C_{10}$-cycloalkyl or $C_3$–$C_{10}$-cycloalkenyl, where the four last-mentioned groups may be unsubstituted or partially or completely halogenated and the four last-mentioned groups may furthermore contain one or two further carboxyl or carbonyl groups,

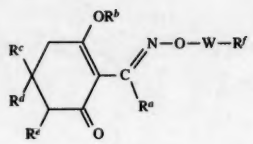
a 5-membered or 6-membered aromatic heterocyclic structure having one oxygen and one sulfur atom or having from one to three hetero atoms selected from the group consisting of three nitrogen atoms and one oxygen or sulfur atom, where three hetero atoms may not be adjacent to one another simultaneously,

phenyl or naphthyl, where these groups may carry from one to three substituents selected from the group consisting of halogen, —COY and —COOY, and the phenyl and naphthyl groups may additionally carry a number of halogen atoms corresponding to the number of substitutable carbon atoms present, and

Y is $C_1$–$C_6$-alkyl, $C_3$–$C_6$-cycloalkyl or phenyl

and one or more herbically active ingredients which are deterimental to crops selected from

A) the group consisting of the cyclohexenone derivatives of the formula II



II

where

$R^a$ is $C_1$–$C_6$-alkyl,

$R^b$ is hydrogen, the equivalent of an agriculturally useful cation, $C_2$–$C_8$-alkylcarbonyloxy, $C_1$–$C_{10}$-alkylsulfonyl, $C_1$–$C_{10}$-alkylphosphonyl or benzoyl, benzenesulfonyl or benzenephosphonyl, where the three last-mentioned groups may furthermore each carry from one to five halogen atoms;

$R^c$ is hydrogen, cyano, formyl, $C_1$–$C_6$-alkyl, $C_1$–$C_4$-alkoxy-$C_1$–$C_6$-alkyl or $C_1$–$C_4$-alkylthio-$C_1$–$C_6$-alkyl, phenoxy-$C_1$–$C_6$-alkyl, phenylthio-$C_1$–$C_6$-alkyl, pyridyloxy-$C_1$–$C_6$-alkyl or pyridylthio-$C_1$–$C_6$-alkyl, where the phenyl and pyridyl rings may each furthermore carry from one to three radicals selected from the group consisting of nitro, cyano, halogen, $C_1$–$C_4$-alkyl, partially or completely halogenated $C_1$–$C_4$-alkyl, $C_1$–$C_4$-alkoxy, partially or completely halogenated $C_1$–$C_4$-alkoxy, $C_1$–$C_4$-alkylthio, $C_3$–$C_6$-alkenyl, $C_3$–$C_6$-alkenyloxy, $C_3$–$C_6$-alkynyl, $C_3$–$C_6$-alkynyloxy and —$NR^3R^h$, where

$R^g$ is hydrogen, $C_1$–$C_4$-alkyl, $C_3$–$C_6$-alkenyl, $C_3$–$C_6$-alkynyl, $C_1$–$C_6$-acyl or benzoyl which may carry from one to three radicals selected from the group consisting of nitro, cyano, halogen, $C_1$–$C_4$-alkyl, partially or completely halogenated $C_1$–$C_4$-alkyl, $C_1$–$C_4$-alkoxy and $C_1$–$C_4$-alkylthio and

$R^h$ is hydrogen, $C_1$–$C_4$-alkyl, $C_3$–$C_6$-alkenyl or $C_3$–$C_6$-alkynyl; $C_3$–$C_7$-cycloalkyl or $C_5$–$C_7$-cycloalkenyl, where these groups may furthermore carry from one to three radicals selected from the group consisting of hydroxyl, halogen, $C_1$–$C_4$-alkyl, partially or completely halogenated $C_1$–$C_4$-alkyl, $C_1$–$C_4$-alkoxy, $C_1$–$C_4$-alkylthio, benzylthio, $C_1$–$C_4$-alkylsulfonyl, $C_1$–$C_4$-alkylsulfenyl and $C_1$–$C_4$-alkylsulfinyl,

a 5-membered saturated heterocyclic structure which contains one or two oxygen or sulfur atoms or one oxygen and one sulfur atom as hetero atoms and which may furthermore carry from one to three radicals selected from the group consisting of $C_1$–$C_4$-alkyl, partially or completely halogenated $C_1$–$C_4$-alkyl, $C_1$–$C_4$-alkoxy and $C_1$–$C_4$-alkylthio,

a 6-membered or 7-membered saturated heterocyclic structure or a mono- or diunsaturated heterocyclic structure which contains one or two oxygen or sulfur atoms or one oxygen and one sulfur atom as hetero atoms and which may furthermore carry from one to three radicals selected from the group consisting of hydroxyl, halogen, $C_1$–$C_4$-alkyl, partially or completely halogenated $C_1$–$C_4$-alkyl, $C_1$–$C_4$-alkoxy and $C_1$–$C_4$-alkylthio,

a 5-membered heteroaromatic structure containing from one to three hetero atoms selected from the group consisting of one or two nitrogen atoms and one oxygen or sulfur atom, where the heteroaromatic structure may furthermore carry from one to three radicals selected from the group consisting of cyano, halogen, $C_1$–$C_4$-alkyl, partially or completely halogenated $C_1$–$C_4$-alkyl, $C_1$–$C_4$-alkoxy, partially or completely halogenated $C_1$–$C_4$-alkoxy, $C_1$–$C_4$-alkylthio, $C_2$–$C_6$-alkenyl, $C_2$–$C_6$-alkenyloxy, $C_3$–$C_6$-alkynyloxy and $C_1$–$C_4$-alkoxy-$C_1$–$C_4$-alkyl,

phenyl or pyridyl, each of which may furthermore carry from one to three radicals selected from the group consisting of nitro, cyano, formyl, halogen, $C_1$–$C_4$-alkyl, partially or completely halogenated $C_1$–$C_4$-alkyl, $C_1$–$C_4$-alkoxy, partially or completely halogenated $C_1$–$C_4$-alkoxy, $C_1$–$C_4$-alkylthio, $C_3$–$C_6$-alkenyl, $C_3$–$C_6$-alkenyloxy, $C_3$–$C_6$-alkynyl, $C_3$–$C_6$-alkynyloxy and —$NR^gR^h$, where $R^g$ and $R^h$ have the abovementioned meanings;

$R^d$ is hydrogen or hydroxyl or, when $R^c$ is $C_1$–$C_6$-alkyl, $R^d$ is $C_1$–$C_6$-alkyl;

$R^e$ is hydrogen, halogen, cyano, a $C_1$–$C_4$-alkoxycarbonyl or a $C_1$–$C_4$-alkylketoxime group;

W is a $C_1$–$C_6$-alkylene, $C_3$–$C_6$-alkenylene or $C_3$–$C_6$-alkynylene chain, each of which may furthermore carry from one to three radicals selected from the group consisting of three $C_1$–$C_3$-alkyl substituents, three halogen atoms and one methylene substituent;

a $C_3$–$C_6$-alkylene or $C_4$–$C_6$-alkenylene chain, both of which may furthermore carry from one to three $C_1$–$C_3$-alkyl radicals, where in each case one methylene group of the chains may be replaced by an oxygen or sulfur atom, a sulfoxyl or sulfonyl group or a group —$N(R^i)$—, where

$R^i$ is hydrogen, $C_1$–$C_4$-alkyl, $C_3$–$C_6$-alkenyl or $C_3$–$C_6$-alkynyl;

$R^f$ is hydrogen; vinyl;

a group —CH=CH—Z, where Z is cyano, halogen, $C_1$–$C_4$-alkyl, partially or completely halogenated $C_1$–$C_4$-alkyl, $C_3$–$C_6$-cycloalkyl, which, if desired, in turn may carry from one to three substituents selected from the group consisting of hydroxyl, halogen, $C_1$–$C_4$-alkyl, partially or completely halogenated $C_1$–$C_4$-alkyl and $C_1$–$C_4$-alkoxy;

carboxy, $C_1$–$C_8$-alkoxycarbonyl, benzyloxycarbonyl, phenyl, thienyl or pyridyl, where these three aromatic radicals may be unsubstituted or may each furthermore carry from one to three substituents selected from the group consisting of nitro, cyano, halogen, $C_1$–$C_4$-alkyl, partially or completely halogenated $C_1$–$C_4$-alkyl, $C_1$–$C_4$-alkoxy, partia lly or completely halogenated $C_1$–$C_4$-alkoxy, $C_1$–$C_4$-alkylthio and $C_3$–$C_6$-cycloalkyl, where the cycloalkyl substituent may be unsubstituted or in turn may furthermore carry from one to three radicals selected from the group consisting of halogen, $C_1$–$C_4$-alkyl, partially or completely halogenated $C_1$–$C_4$-alkyl and $C_1$–$C_4$-alkoxy;

ethynyl which may carry one of the following radicals: $C_1$–$C_4$-alkyl, $C_3$–$C_6$-cycloalkyl, which, if desired, may furthermore carry from one to three substituents selected from the group consisting of hydroxyl, halogen, $C_1$–$C_4$-alkyl, partially or completely halogenated $C_1$–$C_4$-alkyl and $C_1$–$C_4$-alkoxy, or phenyl, thienyl or pyridyl, where these aromatic radicals may be unsubstituted or may each furthermore carry from one to three substituents selected from the group consisting of nitro, cyano, halogen, $C_1$–$C_4$-alkyl, partially or completely halogenated $C_1$–$C_4$-alkyl, $C_1$–$C_4$-alkoxy, partially or completely halogenated $C_1$–$C_4$-alkoxy and $C_1$–$C_4$-alkylthio;

phenyl, halophenyl, dihalophenyl, a 5-membered heteroaromatic group having from one to three hetero atoms, selected from the group consisting of from one to three nitrogen atoms and one oxygen or sulfur atom, or a 6-membered heteroaromatic group having from one to four nitrogen atoms, all of which may not be adjacent to one another at the same time, where the phenyl and hetaryl groups may, if desired, furthermore carry from one to three radicals selected from the group consisting of nitro, $C_1$–$C_4$-alkoxy, $C_1$–$C_4$-alkylthio, partially or completely halogenated $C_1$–$C_4$-alkoxy, radicals Z and —$NR^kR^l$, where

$R^k$ is hydrogen, $C_1$–$C_4$-alkyl, $C_3$–$C_6$-alkenyl or $C_3$–$C_6$-alkynyl and

$R^l$ is hydrogen, $C_1$–$C_4$-alkyl, $C_3$–$C_6$-alkenyl, $C_3$–$C_6$-alkynyl, $C_1$–$C_6$-acyl or benzoyl which, if desired, may furthermore carry from one to three substituents selected from the group consisting of nitro, cyano, halogen, $C_1$–$C_4$-alkyl, partially or completely halogenated $C_1$–$C_4$-alkyl, $C_1$–$C_4$-alkoxy and $C_1$–$C_4$-alkylthio.

5,491,124

## HERBICIDAL COMPOSITIONS COMPRISING CHLOROACETAMIDE AND TRIKETONE HERBICIDES

Theo Quaghebeur, Saint-Symphorien, and Walter Van Loocke, Meetkerke, both of, Belgium, assignors to Sandoz Ltd., Basel, Switzerland

Filed Jun. 20, 1994, Ser. No. 262,725

Claims priority, application United Kingdom, Jun. 25, 1993, 9313210

Int. Cl.[6] A01N *35/06;37/22;43/56;43/72*

U.S. Cl. 504—139 12 Claims

1. A method of controlling undesired plant growth which comprises co-application to the locus of the said undesired plant growth at least one chloroacetamide herbicide selected from acetochlor and metazachlor and at least one triketone herbicide selected from sulcotrione, 2-(4-methylsulfonyloxy-2-nitrobenzoyl)-4,4,6,6-tetramethyl-1,3-cyclohexandione; 3-(4-methylsufonyloxy-2-nitrobenzoyl)-bicyclo-[3,2,1]octane-2,4-dione; 3-(4-methylsulfonyl-2-nitrobenzoyl)-bicyclo-[3,2,1]octane-2,4-dione; 4-(4-chloro-2-nitrobenzoyl)-2,6,6-trimethyl-2H-1,2-oxazine-3,5(4H,6H)-dione; 3-(4-methylthio-2-nitrobenzoyl)-bicyclo[3,2,1]octane-2,4-dione; 4-(2-nitro-4-trifluoromethoxybenzoyl)-2,6,6-trimethyl-2H-1,2-oxazine-3,5(4H,6H)dione in herbicidally effective aggregate amount.

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5,491,125

## LIQUID HERBICIDAL FORMULATIONS OF GLUFOSINATE

Konrad Albrecht, Kelkheim; Jean Kocur, and Peter Langelüddeke, both of Hofheim am Taunus, all of, Germany, assignors to Hoechst Aktiengesellschaft, Germany

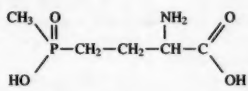
Continuation of Ser. No. 884,266, May 8, 1992, abandoned, which is a continuation-in-part of Ser. No. 324,405, Mar. 16, 1989, abandoned. This application Dec. 1, 1992, Ser. No. 983,964

Claims priority, application Germany, Mar. 18, 1988, 38 09 159.3

Int. Cl.[6] A01N *57/12;57/20*

U.S. Cl. 504—206 5 Claims

1. A liquid herbicidal agent consisting of a compound of the formula



in the form of the racemate or of the L enantiomer, lower alkyl esters thereof or salts thereof with acids or bases (I) in combination with surfactants in the form of

(a) ($C_{12}$–$C_{18}$)-alkyldimethyl-, ($C_{10}$–$C_{18}$)-fatty acid amidopropyldimethyl- or ($C_{10}$–$C_{18}$)-fatty acid amidoethyldimethylamine oxides or

(b) the betaine of coconut alkyldimethylaminoacetic acid or of coconut alkylaminopropionic acid or

(c) mixtures of ($C_{12}$–$C_{18}$)-alkanesulfonates with ($C_{10}$–$C_{18}$)-fatty alcohol polyglycol ether sulfosuccinic acid monoesters or

(d) ($C_{12}$–$C_{18}$)-alkylsulfosuccinic acid monoesters or ($C_{10}$–$C_{18}$)-fatty alcohol polyglycol ether sulfosuccinic acid monoesters and ($C_{10}$–$C_{18}$)-fatty alcohol polyglycol ether sulfosuccinic acid esters and their mixtures with ($C_{10}$–$C_{18}$)-fatty alcohol polyglycol ether sulfates or

(e) ($C_{12}$–$C_{18}$)-α-olefinsulfonates and mixtures thereof with ($C_{10}$–$C_{18}$)-fatty alcohol polyglycol ether sulfates, ($C_{10}$–$C_{18}$)-fatty alcohol polyglycol ether sulfosuccinic acid monoesters or ($C_{12}$–$C_{18}$)-alkylsulfosuccinic acid monoesters, sulfonates which can be used being alkali metal salts, ammonium salts, alkaline earth metal salts or substituted alkyl- or alkanolamine salts of the corresponding sulfonic or sulfuric acids.

5,491,126

## SUBSTITUTED FUSED HETEROCYCLIC HERBICIDES

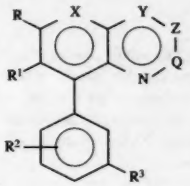
Thomas P. Selby, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Division of Ser. No. 50,475, May 21, 1993, Pat. No. 5,389,600, which is a continuation-in-part of Ser. No. 617,707, Nov. 26, 1990, Pat. No. 5,110,347. This application Oct. 19, 1994, Ser. No. 325,720

Int. Cl.[6] C07D *253/10;* A01N *43/707*

U.S. Cl. 504—228 21 Claims

1. A compound of the formula



I

wherein

X is CH;

Y is N;

Z is N or $CR^5$;

Q is N or $CR^5$;

R is $C_1$–$C_4$ alkyl, $C_2$–$C_4$ alkoxyalkyl, $C_2$–$C_4$ alkenyl, $C_2$–$C_4$ alkynyl, $C_1$–$C_4$ alkoxy, $C_1$–$C_4$ alkylthio, $C_1$–$C_3$ alkylamino or N($C_1$–$C_3$ alkyl) ($C_1$–$C_3$ alkyl);

$R^1$ is H, F, Cl or $CH_3$;

$R^2$ is H, halogen, $C_1$–$C_3$ alkyl, $C_1$–$C_3$ haloalkyl, $C_1$–$C_3$ alkoxy or $C_1$–$C_3$ haloalkoxy;

$R^3$ is H, halogen, $C_1$–$C_4$ alkyl, $C_2$–$C_4$ alkenyl, $C_2$–$C_4$ alkynyl, $C_1$–$C_4$ haloalkyl, $C_3$–$C_4$ halocycloalkyl, $C_2$–$C_4$ haloalkenyl, $C_2$–$C_4$ haloalkynyl, $OR^6$, $S(O)_nR^7$ or CN;

$R^5$ is $C_1$–$C_4$ haloalkyl, $C_3$–$C_5$ halocycloalkyl, $C_2$–$C_4$ haloalkenyl, $C_2$–$C_4$ haloalkynyl, $OR^6$, $S(O)_nR^7$ or halogen;

$R^6$ is $C_1$–$C_4$ alkyl, $C_3$–$C_4$ alkenyl, $C_3$–$C_4$ alkynyl, $C_1$–$C_4$ haloalkyl, $C_2$–$C_4$ haloalkenyl or $C_2$–$C_4$ haloalkynyl;

$R^7$ is $C_1$–$C_2$ alkyl or $C_1$–$C_2$ haloalkyl; and

n is 0, 1 or 2;

or their mono N-oxides or their agriculturally suitable salts, provided that:

(a) when Z is N, then Q is $CR^5$; and

(b) when Q is N, then Z is $CR^5$.

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5,491,127

## COMPOSITE SUPERCONDUCTOR AND METHOD OF THE PRODUCTION THEREOF

Minoru Yokota; Masayuki Nagata; Shigeo Saito, and Yuichi Yamada, all of Osaka, Japan, assignors to Sumitomo Electric Industries, Ltd., Osaka, Japan

Division of Ser. No. 697,482, May 2, 1991, Pat. No. 5,426,093, which is a continuation of Ser. No. 404,198, Sep. 7, 1989, abandoned, which is a division of Ser. No. 193,525, May 13, 1988, Pat. No. 4,883,922. This application Feb. 3, 1995, Ser. No. 383,601

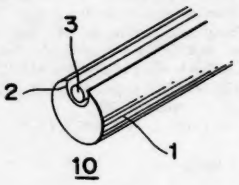
Claims priority, application Japan, May 13, 1987, 62-117651; May 13, 1987, 62-117652; May 13, 1987, 62-117653; May 13, 1987, 62-117654; May 13, 1987, 62-117655; May 13, 1987, 62-117656; May 13, 1987, 62-117657; May 13, 1987, 62-117658; May 13, 1987, 62-117659; May 13, 1987, 62-117660; May 16, 1987, 62-119333

Int. Cl.[6] H01L *39/24*

U.S. Cl. 505—433 8 Claims

1. A method for the production of a composite superconducting wire comprising in sequence:

(a) a step of installing a composite oxide or composite ceramic superconductor wire in a groove of an elongated reinforcing member, said groove extending in a longitudinal direction of said reinforcing member;




(b) a step of covering said reinforcing member with the superconductor wire installed in said groove with an outer pipe;

(c) a step of drawing said reinforcing member covered with said outer pipe to obtain an elongated superconductor wire; and

(d) a step of performing thermal treatment of said elongated superconductor wire with said outer pipe supplying necessary elements from one end of the outer pipe.

(e) a step of removing said outer pipe from said drawn superconductor wire; and

(f) a step of performing thermal treatment of said elongated superconductor wire with said outer pipe removed.

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**5,491,128**

**AGLYCONS OF A/16686 ANTIBIOTICS**

**Romeo Ciabatti, Brodolini, and Bruno Cavalleri, Pierlombardo, both of, Italy, assignors to Gruppo Lepetit S.p.A., Gerenzano, Italy**

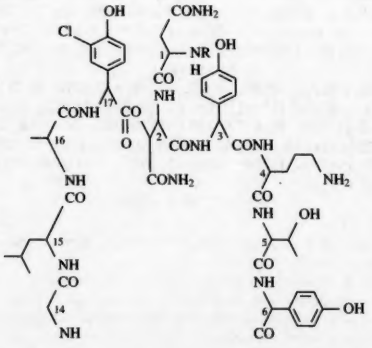
**Continuation of Ser. No. 315,030, Sep. 28, 1994, abandoned, which is a continuation of Ser. No. 210,119, Mar. 17, 1994, abandoned, which is a continuation of Ser. No. 73,252, Jun. 7, 1993, abandoned, which is a continuation of Ser. No. 880,613, May 8, 1992, abandoned, which is a division of Ser. No. 670,378, Mar. 14, 1991, abandoned, which is a continuation of Ser. No. 336,262, Apr. 11, 1989, abandoned. This application Apr. 19, 1995, Ser. No. 425,693**

**Claims priority, application United Kingdom, Apr. 13, 1988, 8808658**

**Int. Cl.**[6] **C07K** *7/54;* **A61K** *38/12;38/15*

**U.S. Cl. 514—11** **6 Claims**

1. A compound of the formula:



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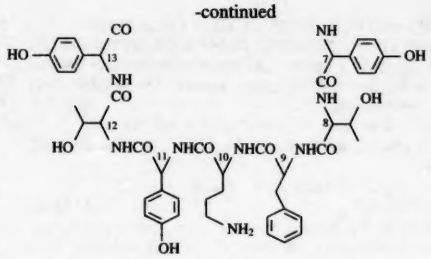

in which R is represented by a substituent selected from the group consisting of

-CO-CH=CH-CH=CH-$CH_2$-$CH_2$-$CH_3$,

-CO-CH=CH-CH=CH-$CH_2$-$CH(CH_3)_2$,

-CO-CH=CH-CH=CH-CH-$CH_2$-$CH_2$-$CH(CH_3)_2$,

-$CO(CH_2)_6$-$CH_3$,-$CO(CH_2)_5CH(CH_3)_2$ and

-$CO(CH_2)_6CH(CH_3)_2$, a pharmaceutically acceptable acid addition salt thereof, or a mixture of said compounds present in any proportion. L00663USF 5

5. A method for combatting infectious diseases in mammals comprising administering an antibacterially effective amount of a compound of claim 1 to a mammal in need thereof.

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**5,491,129**

**SYNTHETIC PEPTIDES DERIVED FROM VITRONECTIN AND PHARMACEUTICAL COMPOSITIONS COMPRISING THEM**

**Shmuel Shaltiel, Rehovot, Israel, assignor to Yeda Research and Development Co. Ltd., Rehovot, Israel**

**Filed Jul. 29, 1993, Ser. No. 98,005**

**Claims priority, application Israel, Jul. 30, 1992, 102688; Dec. 31, 1992, 104296**

**Int. Cl.**[6] **A61K** *38/00;* **C07K** *5/00;7/00;17/00*

**U.S. Cl. 514—12** **19 Claims**

1. A molecule capable of inhibiting a biological activity of plasminogen activator inhibitor-1 (PAI-1) consisting of a peptide having 8 to 23 consecutive amino acids of the sequence Lys-Lys-Glu-Arg-Phe-Arg-His-Arg-Asn-Arg-Lys-Gly-Tyr-Arg-Ser-Gln-Arg-Gly-His-Ser-Arg-Gly-Arg (8–30 of SEQ ID NO:1), or a salt, functional derivative or analog thereof, said analog being obtained by one or more amino acid substitutions, additions or deletions such that the overall properties of the analog are conserved with regard to the overall positive charge density and overall hydrophilic character of the peptide, wherein said molecule does not include the peptides of residues 8–21 of SEQ ID NO:1 or 17–30 of SEQ ID NO:1.

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**5,491,130**

**PEPTIDE INHIBITORS OF FIBRONECTIN AND RELATED COLLAGEN-BINDING PROTEINS**

**David D. Roberts; Henry C. Krutzsch, both of Bethesda; John M. Sipes, Cabin John; Neng-hua Guo, Gaithersburg, and Eric Negre, Bethesda, all of Md., assignors to The United States of America as represented by the Department of Health and Human Services, Washington, D.C.**

**Filed Nov. 10, 1992, Ser. No. 973,235**

**Int. Cl.**[6] **A61K** *38/00;* **C07K** *7/00;7/06;7/08*

**U.S. Cl. 514—13** **12 Claims**

1. A method for binding fibronectin comprising contacting fibronectin with an effective amount of a composition comprising a peptide having a specific binding affinity for the gelatin-binding domain of fibronectin, said peptide having from 3 to 18 amino acids in length and consisting of the sequence (A),

Xa—Xb—His—Trp—Xc, (A)

wherein Xa is H or an amino acid sequence of from 1 to 13 amino acids derived from the consecutively occurring thrombospondin amino acid residues 394–420, Xb is serine, alanins, tryptophan, or threonine and Xc is OH, $NH_2$, or an amino acid sequence of from I to 13 amino acids derived from the consecutively occurring human thrombospondin amino acid residues 424–450, and at least one of Xa and Xb includes a tryptophan residue located within three amino acid residues from Trp in sequence (A).

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**5,491,131**

**SOMATOSTATIN-ACTIVE POLYPEPTIDE COMPOSITION**

**Manuel R. Puyol, and Diego R. Puyol, both of Madrid, Spain, assignors to Applied Research Systems ARS Holding NV, Curacao, Netherlands Antilles**

**Continuation of Ser. No. 623,943, Dec. 6, 1990, abandoned. This application Sep. 16, 1992, Ser. No. 945,836**

**Claims priority, application United Kingdom, Apr. 14, 1989, 8908457**

**Int. Cl.[6] A61K** *38/00;* **C07K** *7/08;7/00*

**U.S. Cl. 514—14** **13 Claims**

1. A method of prophylaxis of a human or animal subject at risk of renal dysfunction, said dysfunction being associated with a pathological contraction of mesangial cells responsive to angiotensin II and/or oxygen free radicals, which comprises the step of: administering a somatostatin-active polypeptide to said subject in a dose effective to prevent said pathological contraction of mesangial cells, wherein said dose is from 10–150 μg/kg/day.

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**5,491,132**

**AMINO ACID DERIVATIVES, A PROCESS FOR THE PREPARATION THEREOF AND PHARMACEUTICAL COMPOSITION COMPRISING THE SAME**

**Keiji Hemmi, Tsukuba; Masahiro Neya, Tsuchiura; Hiroshi Marusawa, Yokohama; Shinya Watanabe, Tsuchiura, and Masashi Hashimoto, Toride, all of, Japan, assignors to Fujisawa Pharmaceutical Co., Ltd., Osaka, Japan**

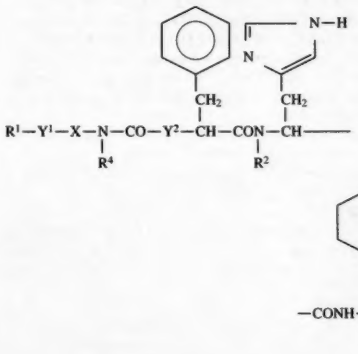
**Continuation of Ser. No. 758,690, Sep. 12, 1991, abandoned. This application Feb. 28, 1994, Ser. No. 202,551**

**Claims priority, application Great Britain, Sep. 17, 1990, 9020305; Mar. 15, 1991, 9105580**

**Int. Cl.[6] A61K** *38/00;* **C07K** *5/00;7/00;17/00*

**U.S. Cl. 514—18** **11 Claims**

1. A compound having the formula:



wherein $R^1$ is morpholinocarbonyl or thiomorpholinocarbonyl;
$R^2$ is methyl;
$R^3$ is isobutyl or 2-ethylbutyl;
$R^4$ is methyl;
X is ethylene;
$Y^1$ is a single bond or

wherein $R^5$ is methyl; and
$Y^2$ is —NH—; or
its pharmaceutically acceptable salt.

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**5,491,133**

**METHODS FOR BLOCKING THE EXPRESSION OF SPECIFICALLY TARGETED GENES**

**Joseph A. Walder; Roxanne Y. Walder; Paul S. Eder, and John M. Dagle, all of Iowa City, Iowa, assignors to University of Iowa Research Foundation, Iowa City, Iowa**

**Continuation of Ser. No. 126,564, Nov. 30, 1987, abandoned. This application Mar. 19, 1991, Ser. No. 672,088**

**Int. Cl.[6] A01N** *43/34;* **C07H** *15/12;* **A61K** *31/395*

**U.S. Cl. 514—44** **13 Claims**

1. An in vitro method of blocking expression of a targeted gene in a eukaryotic cell which expresses the targeted gene comprising:
contacting the cell with an oligodeoxynucleotide, which oligodeoxynucleotide has
(a) complementarily for and is hybridizable to an mRNA region within mRNA transcribed from the targeted gene, such complementarily being sufficient to ensure specificity of hybridization of the oligodeoxynucleotide to the region within the mRNA transcribed from the targeted gene;
(b) a modified 3'-terminal internucleotide phosphodiester linkage, which linkage is resistant to 3' to 5' exonuclease degradation; and
(c) a continuous stretch of at least five nucleotide residues having four internucleotide phosphodiester linkages which are unmodified;
under conditions such that said oligodeoxynucleotide blocks the expression of the targeted gene in the eukaryotic cell.

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**5,491,134**

**SULFONIC, PHOSPHONIC OR PHOSPHINIIC ACID $\beta_3$ AGONIST DERIVATIVES**

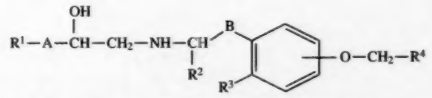
**Philip M. Sher, Plainsboro, and Arvind Mathur, Bridgewater, both of N.J., assignors to Bristol-Myers Squibb Company, Princeton, N.J.**

**Filed Sep. 16, 1994, Ser. No. 307,217**

**Int. Cl.[6] A61K** *31/66;31/185;* **C07F** *9/30;9/38*

**U.S. Cl. 514—114** **14 Claims**

1. A compound of the formula



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or pharmaceutically acceptable salts thereof wherein:
A is a bond or —$OCH_2$—, where the oxygen is linked to $R^1$;
B is —$CH_2$— or when $R^3$ is hydrogen, B may be —$CH_2O$— where the oxygen is linked to the phenyl ring;
$R^1$ is an aryl group;
$R^2$ is hydrogen or lower alkyl;
$R^3$ is hydrogen; or $R^2$ and $R^3$ together form the group —$CH_2CH_2$—; and
$R^4$ is —$SO_3H$, —$P(O_2H)R^5$, —$P(O_2R^{5'})R^5$, —$PO_3H_2$, —$PO_3HR^{5'}$ or —$PO_3(R^{5'})_2$ where $R^5$ and $R^{5'}$ are independently lower alkyl; provided that when A is a bond, $R^4$ is other than —$PO_3H_2$, —$PO_3HR^{5'}$, or —$PO_3(R^{5'})_2$.

## 5,491,135

## COMPOSITIONS OF N-(PHOSPHONOACETYL)-L-ASPARTIC ACID AND METHODS OF THEIR USE AS BROAD SPECTRUM ANTIVIRALS

**Herbert A. Blough, Berwyn, Pa., assignor to U.S. Bioscience, Inc., West Conshohocken, Pa.**

**Continuation-in-part of Ser. No. 853,454, Mar. 18, 1992, abandoned. This application Mar. 17, 1993, Ser. No. 32,234**

**Int. Cl.[6] A61K** *31/505*

**U.S. Cl. 514—115** **13 Claims**

1. A method of treating viral infection caused by an RNA virus selected from the group consisting of flaviviruses, bunyaviruses, Hantaan and filoviruses which comprises administering to a mammal in need of antiviral therapy an effective amount of N-(phosphonoacetyl)-L-aspartic acid or a pharmaceutically acceptable analog thereof.

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## 5,491,136

## 2,19-METHYLENEOXY AND 2,19-METHYLENETHIO BRIDGED STEROIDS AS AROMATASE, 19-HYDROXYLASER INHIBITORS AND METHODS OF THEIR USE IN THE TREATMENT OF ESTROGEN MEDIATED DISORDERS

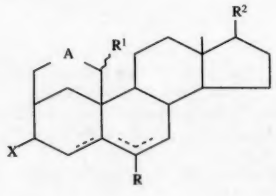
**Norton P. Peet, Cincinnati; J. O'Neal Johnston, Milford, and Joseph P. Burkhart, West Chester, all of Ohio, assignors to Merrell Dow Pharmaceuticals Inc., Cincinnati, Ohio**

**Continuation-in-part of Ser. No. 49,786, Apr. 19, 1993, abandoned, which is a continuation-in-part of Ser. No. 803,239, Dec. 5, 1991, abandoned, which is a division of Ser. No. 674,640, Mar. 25, 1991, Pat. No. 5,099,037, which is a continuation-in-part of Ser. No. 453,441, Dec. 20, 1989, abandoned. This application Mar. 18, 1994, Ser. No. 210,796**

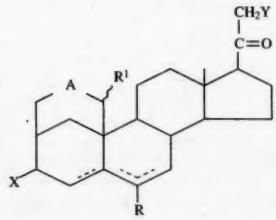
**Int. Cl.[6] A61K** *31/58*

**U.S. Cl. 514—172** **25 Claims**

1. A method of inhibiting aromatase activity which comprises contacting an effective aromarase-inhibiting amount of a compound of the formula:



or



wherein:

----- represents a single or double bond,

A is O, S, SO, or $SO_2$,

R is H, $=CH_2$, =O, or —OH,

$R^1$ is H or $C_{1-4}$ alkyl,

$R^2$ is =O, —OH, or —O—($C_{1-4}$ alkanoyl),

X is =O, $=CH_2$, —OH, or —O—($C_{1-4}$ alkanoyl), and Y is H, —OH, or —O—($C_{1-4}$ alkanoyl), and when Y=H, —OH, or —O—($C_{1-4}$ alkanoyl), X may not include —OH, and R may not include =O or —OH.

with an aromatase enzyme.

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## 5,491,137

## 14α17α-(PROPANO-AND 17²PROPENO) -ESTRATRIENES

**James R. Bull, Cape Town, South Africa; Walter Elger, Berlin, Germany; Karl-Heinrich Fritzemeier, Berlin, Germany, and Rolf Krattenmacher, Berlin, Germany, assignors to Schering Aktiengesellschaft, Berlin, Germany**

**PCT No. PCT/EP92/00946, § 371 Date Oct. 29, 1993, § 102(e) Date Oct. 29, 1993, PCT Pub. No. WO92/19642, PCT Pub. Date Nov. 12, 1992**

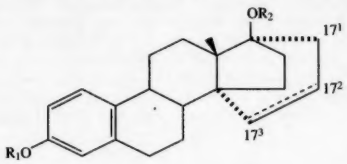
**PCT Filed Apr. 30, 1992, Ser. No. 140,061**

**Claims priority, application Germany, Apr. 30, 1991, 41 14 634.4**

**Int. Cl.[6] A61K** *31/56;* **C07J** *1/00*

**U.S. Cl. 514—182** **6 Claims**

1. A 14α,17α-(propano-or $17^2$-propeno)-estratriene of formula I



I

wherein

$R^1$ is H, methyl, or the acyl moiety of an aliphatic, cycloaliphatic, aliphatic-cycloaliphatic or aromatic $C_{1-12}$-monocarboxylic acid,

$R^2$ is H or the acyl moiety of an aliphatic, cycloaliphatic, aliphatic-cycloaliphatic or aromatic $C_{1-12}$-monocarboxylic acid,

wherein the cycloaliphatic ring in $R^1$ or $R^2$ has 3–5 carbon atoms, and - - - is a C—C single or double bond.

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## 5,491,138

## ESTRADIOL DERIVATIVE ALKYLATING AGENT CONJUGATE WITH REDUCED HORMONAL ACTIVITY, PROCESS FOR PREPARING THE SAME, COMPOUNDS USEFUL FOR THE PREPARATION THEREOF, AND GROWTH INHIBITING COMPOSITION CONTAINING THE CONJUGATE OR ESTRADIOL DERIVATIVE

**Koichi Niimura, Warabi; Takako Kawabe, Hasuda; Tsutomu Wada, Fuchu; Tsuyoshi Saitoh, Toride, and Kenji Bannai, Tokyo, all of, Japan, assignors to Kureha Kagaku Kogyo Kabushiki Kaisha, Japan**

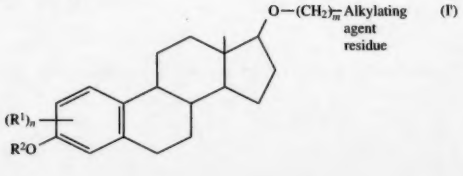
**Division of Ser. No. 317,644, Sep. 26, 1994. This application Mar. 22, 1995, Ser. No. 407,962**

**Claims priority, application Japan, Jan. 5, 1993, 5-273014**

**Int. Cl.[6] A61K** *31/565*

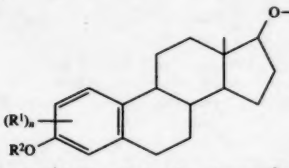
**U.S. Cl. 514—182** **1 Claim**

1. A method for inhibiting growth of a tumor, which comprises administering to a patient suffering from tumor, an effective amount of an estradiol derivative-alkylating agent conjugate of the formula (I'):



(I')

wherein $R^1$ is $C_{1-4}$ alkyl or $C_{1-4}$ alkoxy; $R^2$ is acyl or benzyl; m is an integer of 1 to 3; and n is an integer of 0 to 3, or an estradiol derivative of the formula (II):



(II)

wherein $R^1$ is $C_{1-4}$ alkyl or $C_{1-4}$ alkoxy; $R^2$ is acyl or benzyl; m is an integer of 1 to 3; n is an integer of 0 to 3; and X is hydroxy or halogen.

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**5,491,139**

## ANTIMICROBIAL QUINOLONYL LACTAMS

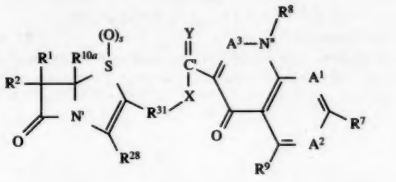
**Thomas P. Demuth, Jr., Norwich, and Ronald E. White, South Plymouth, both of N.Y., assignors to The Procter & Gamble Company, Cincinnati, Ohio**

**Continuation of Ser. No. 672,150, Mar. 19, 1991, abandoned, which is a continuation of Ser. No. 416,646, Oct. 10, 1989, abandoned, which is a continuation-in-part of Ser. No. 261,767, Oct. 24, 1988, abandoned. This application Apr. 6, 1994, Ser. No. 224,120**

**Int. Cl.[6] C07D** *499/00;* **A61K** *31/43*

**U.S. Cl. 514—192** **35 Claims**

1. A compound of the formula



wherein

(A) $R^1$ is hydrogen; halogen; $C_1$–$C_8$ alkyl; $C_2$–$C_8$ alkenyl; a 3–8 atom heteroalkyl having 1 or 2 heteroatoms selected from O, N, or S; a 3–9 atom monocyclic or 7–17 atom polycyclic carbocycle; a 3–9 atom monocyclic or 7–17 atom polycyclic heterocycle; wherein said heterocycles have one or more heteroatoms selected from O,S, or N; $R^{10a}$—O—, $R^{10a}$—O—, $R^{10a}CH{=}N$—, $(R^{10})(R^{11})N$—, $R^{12}$—C(=CHR[15])—C(=O)NH—, $R^{12}$—C(=NO—$R^{14}$)—C(=O)NH—, or $R^{13}$—$(CH_2)_m$—C(=O)NH—; where

(1) m is an integer from 0 to 9;

(2) $R^{10}$ and $R^{11}$ are, independently, $R^{10a}$ where $R^{10a}$ is hydrogen; $C_1$–$C_8$ alkyl; $C_2$–$C_8$ alkenyl; a 3–9 atom monocyclic or 7–17 atom polycyclic heterocycle; or $R^{10}$ and $R^{11}$ together comprise a 3–9 atom monocyclic or 7–17 atom polycyclic heterocycle, including the nitrogen to which they are bonded; wherein said heterocycles have one or more heteroatoms selected from O, S, or N;

(3) $R^{12}$ is hydrogen; $C_1$–$C_8$ alkyl; $C_2$–$C_8$ alkenyl; a 3–8 atom heteroalkyl having 1 or 2 heteroatoms selected from O, N, or S; a 3–8 atom heteroalkenyl having 1 or 2 heteroatoms selected from O, N, or S; a 3–9 atom monocyclic or 7–17 atom polycyclic carbocycle; or a 3–9 atom monocyclic or 7–17 atom polycyclic heterocycle; wherein said heterocycles have one or more heteroatoms selected from O, S, or N;

wherein said arylalkyl is a $C_1$–$C_8$ alkyl substituted with an aryl group; and wherein said heteroarylalkyl is a $C_1$–$C_8$ alkyl substituted with an aryl group having one or more heteroatoms selected from O, N, or S;

(4) $R^{13}$ is $R^{12}$, —$Z^1$, or —$CH(Z^2)(R^{12})$;

(5) $R^{14}$ is $R^{12}$, arylalkyl, heteroarylalkyl, —$C(R^{17})(R^{18})$COOH, —(=O)O—$R^{12}$, or —C(=O)NH—$R^{12}$, where $R^{17}$ and $R^{18}$ are, independently, $R^{12}$ or together comprise a 3–9 atom monocyclic or 7–17 atom polycyclic carbocycle or a 3–9 atom monocyclic or 7–17 atom polycyclic heterocycle, including the carbon atom to which $R^{17}$ and $R^{18}$ are bonded; wherein said heterocycles have one or more heteroatoms selected from O, S, or N, and

wherein said arylalkyl is a $C_1$–$C_8$ alkyl substituted with an aryl group; and wherein said heteroarylalkyl is a $C_1$–$C_8$ alkyl substituted with an aryl group having one or more heteroatoms selected from O, N, or S;

(6) $R^{15}$ is $R^{14}$, halogen, —$Z^1$, or —$CH(Z^2)(R^{12})$;

(7) $Z^1$ is —C(=O)O$R^{16}$, —C(=O)$R^{16}$, —N($R^{19}$)$R^{16}$, —S(O)$_p$$R^{24}$, or —O$R^{24}$; and $Z^2$ is $Z^1$ or —OH, —SH, or —$SO_3$H;

(a) p is an integer from 0 to 2;

(b) $R^{19}$ is hydrogen; $C_1$–$C_8$ alkyl; $C_2$–$C_8$ alkenyl; a 3–8 atom heteroalkyl having 1 or 2 heteroatoms selected from O, N, or S; a 3–8 atom heteroalkenyl having 1 or 2 heteroatoms selected from O, N, or S; a 3–9 atom monocyclic or 7–17 atom polycyclic carbocycle; a 3–9 atom monocyclic or 7–17 atom polycyclic heterocycle; —$SO_3$H; —C(=O)$R^{20}$; or, when $R^{13}$ is —$CH(Z^2)(R^{12})$ and $Z^2$ is —N($R^{19}$)$R^{16}$, $R^{19}$ and $R^{16}$ may together comprise a 3–9 atom monocyclic or 7–17 atom polycyclic heterocycle; wherein said heterocycles have one or more heteroatoms selected from O, S, or N; and

(c) $R^{20}$ is $R^{12}$, NH($R^{12}$), N($R^{12}$)($R^{21}$), O($R^{21}$), or S($R^{21}$); where $R^{21}$ is $C_1$–$C_8$ alkyl; $C_2$–$C_8$ alkenyl; a 3–9 atom monocyclic or 7–17 atom polycyclic carbocycle; a 3–9 atom monocyclic or 7–17 atom polycyclic heterocycle; or when $R^{20}$ is N($R^{12}$)($R^{21}$), $R^{21}$ and $R^{12}$ may together comprise a 3–9 atom monocyclic or 7–17 atom polycyclic heterocycle; wherein said heterocycles have one or more heteroatoms selected from O, S, or N; and

(8) $R^{16}$ is $R^{24}$ or hydrogen; where $R^{24}$ is $C_1$–$C_8$ alkyl; $C_2$–$C_8$ alkenyl; arylalkyl; a 3–8 atom heteroalkyl having of 1 or 2 heteroatoms selected from O, N, or S; a 3–8 atom heteroalkenyl having of 1 or 2 heteroatoms selected from O, N, or S; heteroarylalkyl; a 3–9 atom monocyclic or 7–17 atom polycyclic carbocycle; a 3–9 atom monocyclic or 7–17 atom polycyclic heterocycle; wherein said heterocycles have one or more heteroatoms selected from O, S, or N; and wherein said arylalkyl is a $C_1$–$C_8$ alkyl substituted with an aryl group and wherein said heteroarylalkyl is a $C_1$–$C_8$ alkyl substituted with an aryl group having one or more heteroatoms selected from O, N, or S; or, when $Z^1$ is N($R^{19}$)$R^{16}$ and $R^{16}$ is $R^{24}$, $R^{16}$ and $R^{19}$ may together comprise a 3–9 atom monocyclic or 7–17 atom polycyclic heterocycle including the nitrogen atom to which $R^{19}$ is bonded;

(B) $R^2$ is hydrogen, halogen, alkoxy, or $R^{22}$C(=O)NH—, where $R^{22}$ is hydrogen or $C_1$–$C_8$ alkyl;

(C) S is an integer from 0 to 2;

(D) $R^{31}$ is nil; $C_1$–$C_8$ alkyl; $C_2$–$C_8$ alkenyl; a 3–9 atom monocyclic or 7–17 atom polycyclic carbocycle; or a 3–9 atom monocyclic or 7–17 atom polycyclic heterocycle; wherein said heterocycles have one or more heteroatoms selected from O, S, or N;

(E) X is X' or $Z^4$—$R^{34}$—X', where

(a) $Z^4$ is —O—; —S(O)t—, where t is an integer of 0 to 2; or —N$R^{36}$—;

(b) X' is oxygen, sulfur, or $R^{35}$—N$R^{36}$;

(c) $R^{34}$ is $C_1$–$C_8$ alkyl; $C_2$–$C_8$ alkenyl; a 3–8 atom heteroalkyl having 1 or 2 heteroatoms selected from O, N, or S; a 3–8 atom heteroalkenyl having 1 or 2 heteroatoms selected from O, N, or S; a 3–9 atom monocyclic or 7–17 atom polycyclic carbocycle; or a 3–9 atom monocyclic or 7–17 atom polycyclic heterocycle; wherein said heterocycles have one or more heteroatoms selected from O, S, or N;

(d) $R^{35}$ is nil, N($R^{36}$), or oxygen;

(e) $R^{36}$ is hydrogen; $C_1$–$C_8$ alkyl; $C_2$–$C_8$ alkenyl; a 3–9 atom monocyclic or 7–17 atom polycyclic carbocycle; or a 3–9 atom monocyclic or 7–17 atom polycyclic heterocycle; wherein said heterocycles have one or more heteroatoms selected from O, S, or N;

(F) (1) if X' is sulfur or $R^{35}$—$NR^{36}$, Y is oxygen or Y'; or

(2) if X' is oxygen, Y is Y'; where Y' is sulfur or —$NR^{39}$; where $R^{39}$ is hydrogen; $C_1$–$C_8$ alkyl; oxygen; sulfur; or $N(R^{10a})$; or if $A^3$ is $C(R^{41})$, then $R^{39}$ and $R^{41}$ may together comprise a 3–9 atom monocyclic or 7–17 atom polycyclic heterocycle; wherein said heterocycles have one or more heteroatoms selected from O, S, or N;

(G) (1) $A^1$ is N or $C(R^{40})$; where $R^{40}$ is hydrogen, hydroxy, alkoxy, nitro, cyano, halogen, $C_1$–$C_8$ alkyl, or $N(R^{10})(R^{11})$;

(2) $A^2$ is N or $C(R^6)$; where $R^6$ is hydrogen or halogen;

(3) $A^3$ is N or $C(R^{41})$; where $R^{41}$ is hydrogen;

(4) $R^8$ is hydrogen; $C_1$–$C_8$ alkyl; a 3–9 atom monocyclic or 7–17 atom polycyclic carbocycle; a 3–9 atom monocyclic or 7–17 atom polycyclic heterocycle; alkoxy; hydroxy; $C_2$–$C_8$ alkenyl; arylalkyl, or $N(R^{10})(R^{11})$; wherein said arylalkyl is a $C_1$–$C_8$ alkyl substituted with an aryl group;

(5) $R^7$ is hydrogen; halogen; alkyl; a 3–9 atom monocyclic or 7–17 atom polycyclic carbocycle; or a 3–9 atom monocyclic or 7–17 atom polycyclic heterocycle; wherein said heterocycles have one or more heteroatoms selected from O, S, or N; and

(7) $R^9$ is hydrogen, halogen, nitro, or $N(R^{10})(R^{11})$;

(H) except that

(1) when $A^1$ is $C(R^{40})$, $R^8$ and $R^{40}$ may together comprise a 3–9 atom monocyclic or 7–17 atom polycyclic heterocycle; including N" and $A^1$; wherein said heterocycles have one or more heteroatoms selected from O, S, or N;

(2) when $A^2$ is $C(R^6)$, $R^6$ and $R^7$ may together comprise —O—$(CH_2)_n$—O—, where n is an integer from 1 to 4; and

(3) when $A^3$ is $C(R^{41})$, $R^8$ and $R^{41}$ may together comprise a 3–9 atom monocyclic or 7–17 atom polycyclic heterocycle including N" and the adjacent carbon to which $R^{41}$ is bonded; wherein said heterocycles have one or more heteroatoms selected from O, S, or N;

and pharmaceutically-acceptable salts and biohydrolyzable esters thereof, and hydrates thereof.

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**5,491,140**

## NAPHTHYL TACHYKININ RECEPTOR ANTAGONISTS TO TREAT PHYSIOLOGICAL CONDITIONS

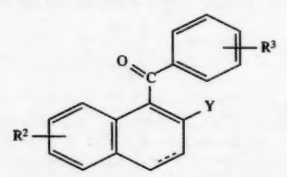
**Robert F. Bruns, Jr., Carmel; Donald R. Gehlert, Indianapolis, both of Ind.; J. Jeffry Howbert, Bellevue, Wash., and William H. W. Lunn, Indianapolis, Ind., assignors to Eli Lilly and Company, Indianapolis, Ind.**

**Filed Jun. 30, 1994, Ser. No. 269,288**

**Int. Cl.[6] A61K** *31/55;31/33;31/535;31/445;31/415;31/40;31/12*

**U.S. Cl. 514—212** **18 Claims**

1. A method for the treatment of a physiological disorder associated with an excess of tachykinins, which method comprises administering to a mammal in need of said treatment an effective amount of a compound of the formula

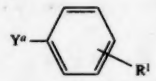


wherein:

$R^2$ is hydrogen, hydroxy, or $C_1$–$C_6$ alkoxy;

the dotted line represents an optional covalent bond;

Y is hydroxy, or



where $Y^a$ is a bond, —$CH_2$—, or —$CH_2CH_2$—; and

$R^1$ is hydrogen, $C_1$–$C_6$ alkyl, $C_1$–$C_6$ alkoxy, or hydroxy;

$R^3$ is aryloxy, $C_1$–$C_6$ alkoxy, hydroxy or —Q—$(CH_2)_n$—$NR^aR^b$ where,

Q is —O— or —$CH_2$—,

n is 1–6,

$R^a$ and $R^b$ are independently hydrogen or $C_1$–$C_6$ alkyl or are taken together with the nitrogen to which they are bonded to constitute a heterocyclic ring selected from the group consisting of pyrrolidinyl, piperazinyl, piperidinyl, hexamethyleneiminyl, imidazolinyl, heptamethyleneiminyl, morpholinyl, and N-methylpyrrolidinyl;

or a pharmaceutically acceptable salt or solvate thereof.

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**5,491,141**

## 2-SUBSTITUTED INDANE-2-MERCAPTOACETYLAMIDE TRICYCLIC DERIVATIVES USEFUL AS INHIBITORS OF ENKEPHALINASE

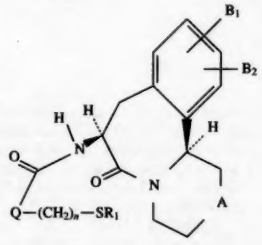
**Alan M. Warshawsky, and Gary A. Flynn, both of Cincinnati, Ohio, assignors to Merrell Dow Pharmaceuticals Inc., Cincinnati, Ohio**

**Division of Ser. No. 78,787, Jun. 17, 1993, Pat. No. 5,420,271, which is a continuation-in-part of Ser. No. 934,833, Aug. 24, 1992, abandoned. This application Mar. 1, 1995, Ser. No. 396,833**

**Int. Cl.[6] A61K** *31/55;* **C07D** *495/06*

**U.S. Cl. 514—214** **5 Claims**

1. A method of inhibiting enkephalinase in a patient in need thereof comprising administering to said patient an effective enkephalinase inhibitory amount of a compound of the formula



wherein

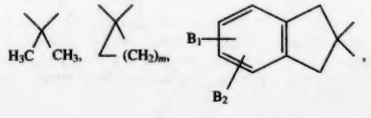
$B_1$ and $B_2$ are each independently hydrogen; hydroxy; —$OR_2$ wherein $R_2$ is a $C_1$–$C_4$ alkyl or an Ar—Y group wherein Ar is aryl and Y is a hydrogen or $C_1$–$C_4$ alkyl; or, where $B_1$ and $B_2$ are attached to adjacent carbon atoms, $B_1$ and $B_2$ can be taken together with said adjacent carbons to form a benzene ring or methylenedioxy;

A is a bond, methylene, oxygen, sulfur, $NR_4$ or $NCOR_5$ wherein $R_4$ is hydrogen, a $C_1$–$C_4$ alkyl or an Ar—Y— group and $R_5$ is —$CF_3$ or a $C_1$–$C_{10}$ alkyl or an Ar—Y— group;

$R_1$ is hydrogen, acetyl, —$CH_2OC(O)C(CH_3)_3$ or benzoyl;

n is an integer 0 to 3; and

Q is a group of the formula



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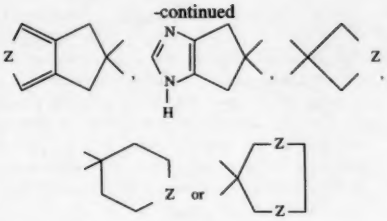

wherein Z is O, $NR_4$ or S; and m is an integer 1 to 5.

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**5,491,142**

## 2-SUBSTITUTED INDANE-2-MERCAPTOACETYLAMIDE TRICYCLIC DERIVATIVES USEFUL AS INHIBITORS OF ENKEPHALINASE

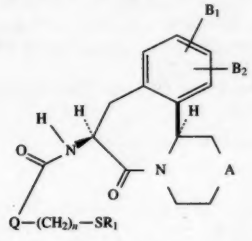
**Alan M. Warshawsky, and Gary A. Flynn, both of Cincinnati, Ohio, assignors to Merrell Dow Pharmaceuticals Inc., Cincinnati, Ohio**

**Division of Ser. No. 78,787, Jun. 17, 1993, Pat. No. 5,420,271, which is a continuation-in-part of Ser. No. 934,833, Aug. 24, 1992, abandoned. This application Mar. 1, 1995, Ser. No. 396,945**

**Int. Cl.[6] A61K** *31/55;* **C07D** *471/04*

**U.S. Cl. 514—214** **1 Claim**

1. A pharmaceutical composition comprising an assayable amount of a compound of the formula



wherein

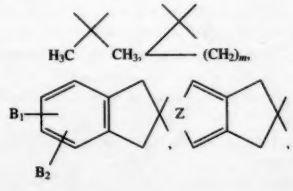
$B_1$ and $B_2$ are each independently hydrogen; hydroxy; —$OR_2$ wherein $R_2$ is a $C_1$–$C_4$ alkyl or an Ar—Y group wherein Ar is phenyl or naphthyl group unsubstituted or substituted with from one to three substituents selected from the group consisting of methylenedioxy, hydroxy, $C_1$–$C_4$ alkoxy, amino, nitro, fluoro and chloro and Y is a hydrogen or $C_1$–$C_4$ alkyl; or, where $B_1$ and $B_2$ are attached to adjacent carbon atoms, $B_1$ and $B_2$ can be taken together with said adjacent carbons to form a benzene ring or methylenedioxy;

A is a bond, methylene, oxygen, sulfur, $NR_4$ or $NCOR_5$ wherein $R_4$ is hydrogen, a $C_1$–$C_4$ alkyl or an Ar—Y— group and $R_5$ is —$CF_3$ or a $C_1$–$C_{10}$ alkyl or an Ar—Y— group;

$R_1$ is hydrogen, acetyl, —$CH_2OC(O)C(CH_3)_3$ or benzoyl;

n is an integer 0 to 3; and

Q is a group of the formula



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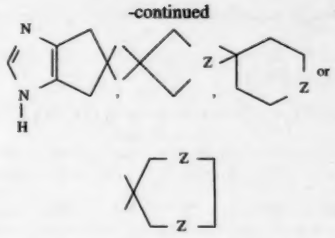

wherein Z is O, $NR_4$ or S; and m is an integer 1 to 5 in admixture or otherwise in association with one or more pharmaceutically acceptable carriers or excipients.

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**5,491,143**

## MERCAPTOACETYLAMIDE DERIVATIVES USEFUL AS INHIBITORS OF ENKEPHALINASE AND ACE

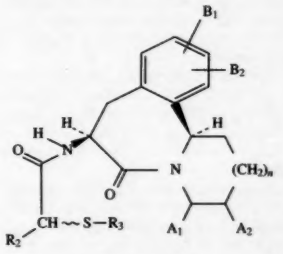
**Gary A. Flynn; Philippe Bey; Alan M. Warshawsky; Douglas W. Beight; Shujaath Mehdi; Eugene L. Giroux, all of Cincinnati; Timothy P. Burkholder, Fairfield, all of Ohio; Edward D. Daugs, Midland, Mich., and John F. French, Cincinnati, Ohio, assignors to Merrell Dow Pharmaceuticals Inc., Cincinnati, Ohio**

**Division of Ser. No. 149,572, Nov. 9, 1993, Pat. No. 5,430,145, which is a continuation-in-part of Ser. No. 75,981, Jun. 11, 1993, abandoned, which is a continuation-in-part of Ser. No. 863,600, Apr. 3, 1992, abandoned, which is a continuation-in-part of Ser. No. 735,496, Jul. 25, 1991, abandoned, which is a continuation-in-part of Ser. No. 600,052, Oct. 18, 1990, abandoned. This application Apr. 5, 1995, Ser. No. 417,424**

**Int. Cl.[6] A61K** *31/55;* **C07D** *487/04*

**U.S. Cl. 514—214** **2 Claims**

1. A composition comprising an assayable amount of a compound of the formula



wherein

$A_1$ and $A_2$ are each independently hydrogen or —$COOR_4$ wherein $R_4$ is hydrogen; —$CH_2O$— $C(O)C(CH_3)_3$; a $C_1$–$C_4$ alkyl; an Ar—Y— group wherein Ar is phenyl or naphtyl group unsubstituted or substituted with from one to three substituents selected from the group consisting of methylenedioxy, hydroxy, $C_1$–$C_4$ alkoxy, fluoro and chloro and Y is a $C_0$–$C_4$ alkyl; or diphenylmethyl; with the proviso that where $A_1$ is hydrogen, $A_2$ is —$COOR_4$, and where $A_1$ is —$COOR_4$, $A_2$ is hydrogen;

$B_1$ and $B_2$ are each independently hydrogen; hydroxy; —$OR_5$ wherein $R_5$ is a $C_1$–$C_4$ alkyl or an Ar—Y— group; or, where $B_1$ and $B_2$ are attached to adjacent carbon atoms, $B_1$ and $B_2$ can be taken together with said adjacent carbons to form a benzene ring or methylenedioxy;

$R_2$ is hydrogen, $C_1$–$C_8$ alkyl, —$CH_2OCH_2CH_2OCH_3$ or an Ar—Y— group;

$R_3$ is hydrogen, acetyl, —$CH_2O$— $C(O)C(CH_3)_3$ or benzoyl; and

n is an integer 0 or 1;

in admixture or otherwise in association with an inert carrier.

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**5,491,144**

## SUBSTITUTED DIAMINOPHTHALIMIDES AND ANALOGUES

**Uwe Trinks, Münchenstein, and Peter Traxler, Schönenbuch, both of, Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.**

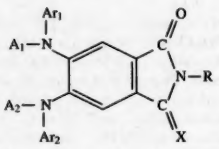
**Continuation of Ser. No. 124,915, Sep. 21, 1993, abandoned, which is a continuation-in-part of Ser. No. 890,218, May 28, 1992, abandoned. This application Dec. 21, 1994, Ser. No. 360,864**

**Claims priority, application Switzerland, May 30, 1991, 1601/91**

**Int. Cl.**[6] **A61K** *31/40;31/505;* **C07D** *209/48;241/38*

**U.S. Cl. 514—245** **22 Claims**

1. A compound of formula I



(I)

wherein

$A_1$ and $A_2$ are each independently of the other hydrogen; lower alkyl; lower alkenyl; lower alkynyl; aryl; acyl which is selected from the group consisting of lower alkanoyl, halo-lower alkanoyl, aryl-lower alkanoyl, and arylcarbonyl; lower alkylsulfonyl; or arylsulfonyl;

or wherein

$A_1$ and $A_2$ together form unsubstituted or lower alkyl- or hydroxy-substituted lower alkylene;

$Ar_1$ and $Ar_2$ are each independently of the other aryl;

heteroaryl selected form the group consisting of imidazolyl, triazolyl, pyridyl, pyrimidinyl, and triazinyl, each of said heteroaryls being unsubstituted or substituted, the substituents being independently selected from the group consisting of lower alkyl, hydroxy, lower alkoxy, halogen, cyano, and trifluoromethyl;

or unsubstituted or substituted $C_3$–$C_8$cycloalkyl;

the group —C(=X)— is —C(=O)—, —C(=S)—, $CH_2$— or —C(=$CR_1R_2$)— wherein $R_1$ and $R_2$ are each independently of the other hydrogen or lower alkyl; and

R is hydrogen, lower alkyl, aryl-lower alkyl, amino, hydroxy or lower alkoxy;

aryl, at each occurence being phenyl or naphthyl, and each of said aryl being unsubstituted or substituted by one or more substituents selected from the group consisting of

lower alkyl, lower alkenyl, lower alkynyl, lower alkylene (linked to two adjacent carbon atoms), $C_3$–$C_8$cycloalkyl, phenyl-lower alkyl, phenyl,

lower alkyl substituted by one or more substituents indently selected from hydroxy, lower alkoxy, phenyl-lower alkoxy, lower alkanoyloxy, halogen, amino, lower alkylamino, di-(lower alkyl)amino, mercapto, lower alkylthio, lower alkylsulfinyl, lower alkylsulfonyl, carboxy, lower alkoxycarbonyl, carbamoyl, N-lower alkylcarbamoyl, N,N-di-lower alkylcarbamoyl and cyano;

hydroxy, lower alkoxy, halo-lower alkoxy, phenyl-lower alkoxy, phenoxy, lower alkenyloxy, halo-lower alkenyloxy, lower alkynyloxy, lower alkylenedioxy (linked to two adjacent carbon atoms), lower alkanoyloxy, phenyl-lower alkanoyloxy, phenylcarbonyloxy, mercapto, lower alkylthio, phenyl-lower alkylthio, phenylthio, lower alkylsulfinyl, phenyl-lower alkylsulfinyl, phenylsulfinyl, lower alkylsulfonyl, phenyl-lower alkylsulfonyl, phenylsulfonyl, halogen, nitro, amino, lower alkylamino, $C_3$–$C_8$cycloalkylamino, phenyl-lower alkylamino, phenylamino, di-(lower alkylamino), N-lower alkyl-N-phenylamino, N-lower alkyl-N-phenyl-lower alkylamino, lower alkyleneamino, lower alkyleneamino interrupted by —O—, —S— or —NR" (wherein R" is hydrogen, lower alkyl or lower alkanoyl); lower alkanoylamino, phenyl-lower alkanoylamino, phenylcarbonylamino, lower alkanoyl, phenyl-lower alkanoyl, phenylcarbonyl, carboxy, lower alkoxycarbonyl, carbamoyl, N-lower alkylcarbamoyl, N,N-di-lower alkylcarbamoyl, N-hydroxycarbamoyl, N-phenylcarbamoyl, cyano, sulfo, lower alkylsulfonyl, sulfamoyl, N-lower alkylsulfamoyl, N,N-di-lower alkylsulfamoyl and N-phenylsulfamoyl;

(phenyl groups occurring in the substitutents each being unsubstituted or substituted by one or more substitutents selected from lower alkyl, lower alkoxy, hydroxy, halogen and trifluoromethyl);

or a salt thereof when salt-forming groups are present.

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**5,491,145**

## IMIDAZOPYRIDAZINES, THEIR PRODUCTION AND USE

**Akio Miyake, Hirakata; Yasuhiko Kawano, Suita, and Yasuko Ashida, Takatsuki, all of, Japan, assignors to Takeda Chemical Industries, Ltd., Osaka, Japan**

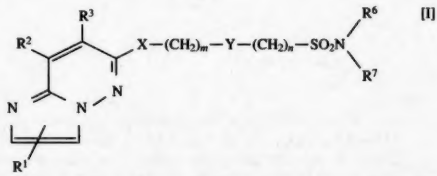
**Continuation of Ser. No. 32,297, Mar. 17, 1993, abandoned. This application Nov. 21, 1994, Ser. No. 345,326**

**Claims priority, application Japan, Mar. 18, 1992, 4-061883; Jan. 26, 1993, 5-010917**

**Int. Cl.**[6] **A61K** *31/50;* **C07D** *487/04*

**U.S. Cl. 514—248** **17 Claims**

1. A compound of the formula:



[I]

wherein $R^1$ stands for a hydrogen atom; $R^2$ and $R^3$ independently stand for a hydrogen atom or a $C_{1-3}$ alkyl group, provided that either $R^2$ or $R^3$ is a hydrogen atom, the other being a $C_{1-3}$ alkyl group; X stands for an oxygen atom; Y stands for a group of the formula:

wherein $R^4$ and $R^5$ independently stand for a hydrogen atom or a $C_{1-3}$ alkyl group; $R^6$ and $R^7$ independently stand for a hydrogen atom or a $C_{1-3}$ alkyl group; m stands for 1; and n stands for 1 to 4, or a pharmaceutically acceptable salt thereof.

3. 6-(2,2-dimethyl-3-sulfamoyl-1-propoxy) -7-methylimidazo [1,2-b]pyridazine.

4. 6-(2,2 -dimethyl -3- sulfamoyl -1-propoxy)-8 -methylimidazo [1,2,-b]pyridazine.

5. 6-(2,2 -diethyl -3- sulfamoyl -1-propoxy)-7 -methylimidazo [1,2-b]pyridazine.

**5,491,146**

## HYDROXYLATED ERYTHRO-HYDROXYNONYLADENINES AND RELATED ANALOGS

**Elie Abushanab, Peacedale, R.I., assignor to Cypros Pharmaceutical Corporation, Carlsbad, Calif.**

**Continuation-in-part of Ser. No. 4,721, Jan. 14, 1993, abandoned. This application Sep. 19, 1994, Ser. No. 308,590**

**Int. Cl.[6] A61K** *31/52;* **C07D** *473/18;473/32;473/34*

**U.S. Cl. 514—261** **13 Claims**

**1**. A compound selected from the group consisting of:

(a) 9-[2(S),9-dihydroxy-3(R)-nonyl]adenine;

(b) pharmacologically acceptable salts thereof;

(c) pharmacologically acceptable isomers thereof which inhibit adenosine deaminase activity with a Ki value between about $10^{-7}$ and about $10^{-10}$; and,

(d) pharmacologically acceptable analogs thereof which have a chemical moiety, other than hydrogen or a hydroxy group, bonded to the number 9 carbon atom on the side chain and which inhibit adenosine deaminase activity with a Ki value between about $10^{-7}$ to about $10^{-10}$.

**8**. A method of synthesizing a hydroxylated analog of erythro-hydroxynonyladenine in which an erythro-hydroxynonyl side chain attached to an adenyl structure has been modified by addition of at least one moiety that normally is not present in erythro-hydroxynonyladenine, comprising the following steps:

a. reacting an epoxide reagent having a desired chiral orientation with an alkyl halide reagent having an unsaturated bond between two selected carbon atoms, under conditions which cause said reagents to create an unsaturated aliphatic compound comprising a first portion having a desired chiral orientation and a second portion having an unsaturated bond;

b. reacting the unsaturated aliphatic compound with at least one third reagent under conditions which cause said third reagent to modify the unsaturated aliphatic compound by adding at least one hydroxyl group to at least one of the two carbon atoms which previously were bonded to each other by the unsaturated bond, thereby creating a hydroxylated saturated aliphatic compound;

c. completing any additional steps necessary to remove any protective groups and to finish synthesizing the hydroxylated analog of erythro-hydroxynonyladenine; and,

d. purifying said hydroxylated analog of erythro-hydroxynonyladenine.

**10**. A method of inhibiting adenosine deaminase activity in a patient in need thereof, wherein the patient is receiving a therapeutic drug that is degraded by adenosine deaminase in the absence of an adenosine deaminase inhibitor, comprising administering to the patient a therapeutically effective quantity of a pharmacologically acceptable analog of erythro-hydroxynonyladenine in which an erythro-hydroxynonyl side chain has been modified by addition of at least one moiety that normally is not present in erythro-hydroxynonyladenine, wherein said analog is a pharmacologically acceptable inhibitor of adenosine deaminase.

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**5,491,147**

## TRI-SUBSTITUTED PHENYL DERIVATIVES AND THEIR USE IN PHARMACEUTICAL COMPOSITIONS AND METHODS OF TREATMENT

**Ewan C. Boyd, Slough; Michael A. W. Eaton, Watlington, and Graham J. Warrellow, Northwood, all of, United Kingdom, assignors to Celltech, Limited, Slough, United Kingdom**

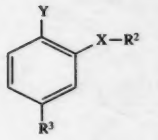
**Continuation of Ser. No. 141,873, Oct. 22, 1993, abandoned. This application Feb. 13, 1995, Ser. No. 387,551**

**Claims priority, application United Kingdom, Jan. 23, 1992, 9222253**

**Int. Cl.[6] A61K** *31/50;31/505;* **C07D** *239/26;237/08*

**U.S. Cl. 514—247** **21 Claims**

**1**. A compound of formula (1)



(1)

wherein:

Y is halogen or —$OR^1$, where $R^1$ is substituted or unsubstituted $C_{1-6}$alkyl, said $R^1$ substituent being halogen;

$R^2$ is substituted or unsubstituted $C_{3-8}$cycloalkyl or substituted or unsubstituted $C_{3-8}$cycloalkenyl, said $R^2$ substituents being halogen, $C_{1-6}$alkyl, hydroxyl or $C_{1-6}$alkoxy;

$R^3$ is substituted or unsubstituted pyrimidinyl or substituted or unsubstituted pyridazinyl, said $R^3$ substituents being $C_{1-6}$alkyl; $C_{1-6}$alkoxy; $C_{2-6}$alkylenedioxy; $C_{3-7}$cycloalkoxy; halo$C_{1-6}$alkyl; $C_{1-6}$alkylthio; nitro; carboxyl (—$CO_2$H) and carboxyl esterified by $C_{1-6}$alkyl, $C_{6-12}$aryl$C_{1-3}$alkyl or $C_{6-12}$aryl; $C_{1-6}$alkanoyl (—C(=O)Alk[1]); sulphonyl (—$SO_3$H) $C_{1-6}$alkylsulphonyl (—$SO_2$Alk[1]); aminosulphonyl (—$SO_2NH_2$); $C_{1-6}$alkylaminosulphonyl (—$SO_2$NHAlk[1]); $C_{1-6}$dialkylaminosulphonyl (—$SO_2$N(Alk[1])$_2$); carboxamido (—$CONH_2$); $C_{1-6}$alkylaminocarbonyl (—CONHAlk[1]); $C_{1-6}$dialkylaminocarbonyl (—CON(Alk[1])$_2$); sulphonylamino (—$NHSO_2$H); $C_{1-6}$alkylsulphonylamino (—$NHSO_2$Alk[1]); $C_{1-6}$dialkylsulphonylamino (—$NSO_2$(Alk[1])$_2$); $C_{1-6}$alkanoylamino (—NHC(=O)Alk[1]); or $C_{1-6}$alkanoylaminoC$_{1-6}$alkyl (—N(Alk[1])C(=O)Alk[1]); where Alk[1] is straight or branched $C_{1-6}$alkylene; and

X is —O—, —S—, or —N($R^5$)—, where $R^5$ is hydrogen or $C_{1-6}$alkyl;

or a salt, solvate, hydrate or N-oxide thereof.

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**5,491,148**

## ISOQUINOLINONE AND DIHYDROISOQUINOLINONE 5-HT$_3$ RECEPTOR ANTAGONISTS

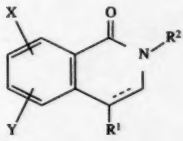
**Jacob Berger, Los Altos Hills, and Robin D. Clark, Palo Alto, both of Calif., assignors to Syntex (U.S.A.) Inc., Palo Alto, Calif.**

**Filed Apr. 26, 1991, Ser. No. 692,407**

**Int. Cl.[6] A61K** *31/44;* **C07D** *453/02*

**U.S. Cl. 514—305** **41 Claims**

**1**. A compound of Formula I:



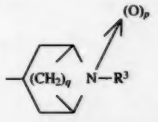
(I)

in which:

X and Y are independently hydrogen, halogen, hydroxy, lower alkoxy, lower alkyl, nitro, amino, aminocarbonyl, (lower alkyl)amino, di(lower alkyl)amino, or (lower alkanoyl)amino;

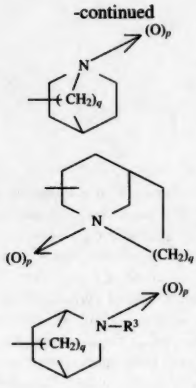
$R^1$ is hydrogen, lower alkyl, phenyl or halogen;

$R^2$ is a group of Formulae (a), (b), (c), or (d):



(a)

-continued



in which:

p is 0 or 1;

q is 1, 2 or 3; and

$R^3$ is $C_{1-7}$ alkyl, $C_{3-8}$ cycloalkyl, $C_{3-8}$ cycloalkyl-$C_{1-2}$ alkyl, or a group $(CH_2)_tR^4$ where t is 1 or 2 and $R^4$ is thienyl, pyrrolyl, or furyl, each optionally further substituted by one or two substituents being $C_{1-6}$ alkyl, $C_{1-6}$ alkoxy, trifluoromethyl or halogen, or is phenyl optionally substituted by one or two substituents being $C_{1-4}$ alkoxy, trifluoromethyl, halogen, nitro, carboxy, esterified carboxy, or $C_{1-4}$ alkyl optionally substituted by hydroxy, $C_{1-4}$ alkoxy, carboxy, esterified carboxy or in vivo hydrolyzable acyloxy; and the dashed line denotes an optional bond, except that the bond is present when $R^1$ is halogen or $R^2$ is a group of Formula (a); or a pharmaceutically acceptable salt, or an individual isomer or mixtures of isomers thereof.

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**5,491,149**

## DIHYDROXYPROPYLAMINE CONTAINING RETROVIRAL PROTEASE INHIBITORS

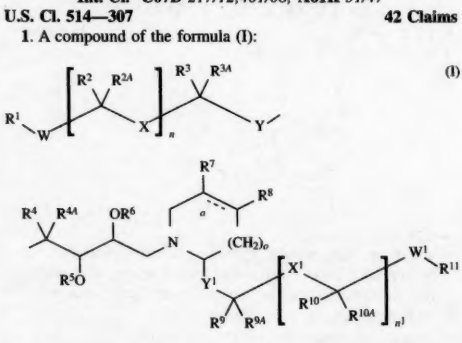
**Prabhakar K. Jadhav, Wilmington, Del., assignor to The Du Pont Merck Pharmaceutical Company, Wilmington, Del.**

**Continuation-in-part of Ser. No. 760,519, Sep. 16, 1991, abandoned. This application Aug. 26, 1994, Ser. No. 296,998**

**Int. Cl.**[6] **C07D** *217/12;401/08;* **A61K** *31/47*

**U.S. Cl. 514—307** **42 Claims**

1. A compound of the formula (I):



or a pharmaceutically acceptable salt, chiral, diastereomeric or racemic form thereof wherein:

$R^1$, $R^2$, $R^3$, $R^4$, $R^7$, $R^8$, $R^9$, $R^{10}$, and $R^{11}$ are independently selected from the following groups:

hydrogen;

$C_1$–$C_8$ alkyl substituted with 0–3 $R^{12}$;

$C_2$–$C_8$ alkenyl substituted with 0–3 $R^{12}$;

$C_3$–$C_8$ alkynyl substituted with 0–3 $R^{12}$;

$C_3$–$C_8$ cycloalkyl substituted with 0–3 $R^{12}$;

$C_6$–$C_{10}$ bicycloalkyl substituted with 0–3 $R^{12}$;

aryl substituted with 0–3 $R^{13}$;

a $C_6$–$C_{14}$ carbocyclic ring substituted with 0–3 $R^{13}$;

a heterocyclic ring substituted with 0–2 $R^{13}$, composed of 5 to 10 atoms including from 1 to 3 nitrogen, oxygen or sulfur atoms, with the remaining atoms being carbon;

additionally, $R^7$ and $R^8$ may join together to form a saturated or unsaturated $C_5$–$C_{14}$ carbocyclic ring substituted with 0–3 $R^{12}$, or a heterocyclic ring substituted with 0–2 $R^{13}$, said heterocyclic ring being composed of 5 to 10 atoms including 1 to 3 nitrogen, oxygen, or sulfur atom with the remaining atoms being carbon;

$R^{2A}$, $R^{3A}$, $R^{4A}$, $R^{9A}$, and $R^{10A}$ are independently selected from the following groups:

hydrogen;

$C_1$–$C_4$ alkyl substituted with halogen or $C_1$–$C_2$ alkoxy;

benzyl substituted with halogen or $C_1$–$C_2$ alkoxy;

$R^5$ and $R^6$ are independently selected from the following groups:

hydrogen;

$C_1$–$C_6$ alkoxycarbonyl;

$C_1$–$C_6$ alkylcarbonyl;

benzoyl;

phenoxycarbonyl; or

phenylaminocarbonyl; wherein said alkyl groups are substituted with 0–3 $R^{12}$, and said aryl groups are substituted with 0–3 $R^{13}$; or a hydrolyzable group that, when administered to a mammalian subject, is metabolically cleaved to form the diol in which $R^5$ and $R^6$ are hydrogen;

$R^{12}$ is selected from one or more of the following:

keto, halogen, cyano, $—NR^{14}R^{15}$, $—CO_2R^{14}$, $—OC(=O)R^{15}$, $—OR^{14}$, $C_2$–$C_6$ alkoxyalkyl, $—S(O)_mR^{14}$, $—NHC(=NH)NHR^{14}$, $—C(=NH)NHR^{14}$, $—C(=O)NR^{14}R^{15}$, $—NR^{15}C(=O)R^{15}$, $—NR^{15}C(=O)OR^{15}$, $—OC(=O)NR^{14}R^{15}$, $—NR^{14}C(=O)NR^{14}R^{15}$, $—NR^{15}SO_2NR^{14}R^{15}$, $—NR^{15}SO_2R^{14}$, $—SO_2NR^{14}R^{15}$, $C_1$– $C_4$ alkyl, $C_2$–$C_4$ alkenyl, $C_3$–$C_6$ cycloalkyl, $C_3$–$C_6$ cycloalkylmethyl;

a $C_5$–$C_{14}$ carbocyclic ring substituted with 0–3 $R^{13}$;

aryl substituted with 0–3 $R^{13}$;

or a heterocyclic ring substituted with 0–2 $R^{13}$, said heterocyclic ring being composed of 5 to 10 atoms including 1 to 3 nitrogen, oxygen, or sulfur atom with the remaining atoms being carbon;

$R^{13}$, when a substituent on carbon, is selected from one to 3 of the following:

phenyl, benzyl, phenethyl, phenoxy, benzyloxy, halogen, hydroxy, nitro, cyano, $C_1$–$C_4$ alkyl, $C_3$–$C_6$ cycloalkyl, $C_3$–$C_6$ cycloalkylmethyl, $C_7$–$C_{10}$ arylalkyl, alkoxy, $—NR^{14}R^{15}$, $C_2$–$C_6$ alkoxyalkyl, $C_1$–$C_4$ hydroxyalkyl, methylenedioxy, ethylenedioxy, $C_1$–$C_4$ haloalkyl, $C_1$–$C_4$ haloalkoxy, $C_1$–$C_4$ alkoxycarbonyl, $C_1$–$C_4$ alkylcarbonyloxy, $C_1$–$C_4$ alkylcarbonyl, $C_1$–$C_4$ alkylcarbonylamino, $—S(O)_mR^{14}$, $—SO_2NR^{14}R^{15}$, $—NHSO_2R^{15}$;

or $R^{13}$ may be a 3- or 4-carbon chain attached to adjacent carbons on the ring to form a fused 5- or 6-membered ring, said 5- or 6-membered ring being substituted on the aliphatic carbons with from 1 to 3 halogen, $C_1$–$C_4$ alkyl, $C_1$–$C_4$ alkoxy, hydroxy, or $NR^{14}R^{15}$; or, when $R^{13}$ is attached to a saturated carbon atom it may be carbonyl or thiocarbonyl;

and $R^{13}$, when a substituent on nitrogen, is independently selected from the following:

phenyl, benzyl, phenethyl, hydroxy, $C_1$–$C_4$ hydroxyalkyl, $C_1$–$C_4$ alkoxy, $C_1$–$C_4$ alkyl, $C_3$–$C_6$ cycloalkyl, $C_3$–$C_6$ cycloalkylmethyl, $—NR^{14}R^{15}$, $C_2$–$C_6$ alkoxyalkyl, $C_1$–$C_4$ haloalkyl, $C_1$–$C_4$ alkoxycarbonyl, $C_1$–$C_4$ alkylcarbonyloxy, $C_1$–$C_4$ alkylcarbonyl;

$R^{14}$ is H, phenyl, benzyl or $C_1$–$C_6$ alkyl;

$R^{15}$ is H or $C_1$–$C_4$ alkyl;

or $R^{14}$ and $R^{15}$ can join to form $(CH_2)_4$, $(CH_2)_5$, $(CH_2CH_2N(R^{16})CH_2CH_2)$, or $(CH_2CH_2OCH_2CH_2)$;

$R^{16}$ i s H or $CH_3$;

a is a double or single bond;

m is 0, 1 or 2;

n and $n^1$ are independently 0 or 1;
o is 0, 1, 2 or 3;
W and $W^1$ are independently selected from the following:
—$NR^{16}C(=Q)NR^{16}$—; —$C(=Q)NR^{16}$—; —$C(=Q)O$—; —$NR^{16}C(=Q)O$—; —$OC(=Q)NR^{16}$—; —$NR^{16}C(=Q)$—; —$C(=Q)$—; —$C(=Q)CH_2$—; —$NR^{16}SO_2NR^{16}$— —$NR^{16}SO_2$—; —$SO_2NR^{16}$— —$SO_2$—; —$QCH_2$—; —Q—; —$(CH_2)_pNR^{16}$—; —$CH_2CH_2$—; —CH=CH—; —CH(OH)CH(OH)—; —$CH(OH)CH_2$—; —$CH_2CH(OH)$—; —CH(OH)—; —NH—NH—; —C(=O)NH—NH—; —C(Cl)=N—; —$C(—OR^{16})=N$—; —$C(—NR^{16}R^{17})=N$—; —$OP(=O)(Q^1R^{16})O$—; —$P(=O)(Q^1R^{16})O$—; —$SO_2NHC(=O)NH$—; or a direct bond;
X and $X^1$ are independently selected from the following:
—$C(=Q)NR^{16}$—; —C(=Q)O—; —C(=Q)—; —$CH_2C(=Q)$—; —$CH_2C(=Q)CH_2$—; —$C(=Q)CH_2$—; —$SO_2NR^{16}$—; —$SO_2$—; —$CH_2QCH_2$—; —$CH_2Q$—; —$CH_2NR^{16}$—; —$CH_2CH_2$—; —CH=CH—; —CH(OH)CH(OH)—; —$CH(OH)CH_2$—; —$CH_2CH(OH)$—; —CH(OH)—; —C(=O)NH—NH—; —$C(—OR^{16})=N$—; —$C(—NR^{16}R^{17})=N$—; —C(L)=N—;
Y and $Y^1$ are independently selected from the following:
—$C(=Q)NR^{16}$—; —$(CH_2)_pC(=Q)NR^{16}$—; —$SO_2NR^{16}$—; —$CH_2NR^{16}$—; —C(L)=N—; —$C(—OR^{16})=N$—; —$C(—NR^{16}R^{17})=N$—; —$NR12C(=O)NR^{16}$—; —$(CH_2)_pNR12C(=O)NR^{16}$—; —$OC(=O)NR^{16}$—; —$(CH_2)_pOC(=O)NR^{16}$—;
$R^{17}$ is H, benzyl or $C_1$–$C_4$ alkyl;
$R^{18}$ is H or $C_1$–$C_4$ alkyl;
L is Cl or Br;
p is 1 or 2;
Q is selected from oxygen or sulfur; and
$Q^1$ is selected from oxygen, sulfur, $NR^{14}$ or a direct bond.

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## 5,491,150
## SUPPLEMENTARY THERPEUTIC AGENTS FOR THE TREATMENT OF IMMUNODEFICIENCY SYNDROME

**Tadao Aoki, Nigata, and Hideo Miyakoshi, Hachiohji, both of, Japan, assignors to Ajinomoto Co., Inc., Tokyo, Japan**

**Filed Jan. 27, 1994, Ser. No. 187,017**
**Claims priority, application Japan, Jan. 27, 1993, 5-029668; Dec. 27, 1993, 5-346875**
**Int. Cl.[6] A61K** *37/02;31/195;31/22*
**U.S. Cl. 514—310** **10 Claims**

1. A supplementary therapeutic composition for treating a patient with an immunodeficiency syndrome comprising (1) at least one agent selected from the group consisting of L-cysteine, L-cystine, L-glutamine, or a salt thereof and (2) a pharmaceutically acceptable carrier.

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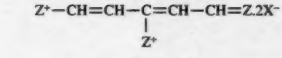
## 5,491,151
## ANTITUMOR TREATMENT METHOD

**Yoshinori Nakagawa; Tetsuo Kimoto, and Makoto Takeuchi, all of Okayama, Japan, assignors to Kabushiki Kaisha Hayashibara Seibutsu Kagaku Kenkyujo, Okayama, Japan**

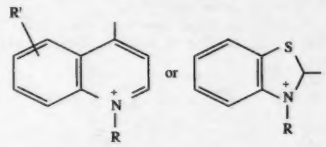
**Continuation of Ser. No. 203,747, Mar. 1, 1994, abandoned, which is a continuation of Ser. No. 894,686, Jun. 5, 1992, abandoned, which is a division of Ser. No. 570,455, Aug. 21, 1990, abandoned. This application Jun. 7, 1995, Ser. No. 486,615**
**Claims priority, application Japan, Aug. 30, 1989, 1-224165**
**Int. Cl.[6] A61K** *31/47*
**U.S. Cl. 514—311** **6 Claims**

1. A method for activating macrophages in a mammal comprising:

administering to said mammal, an amount sufficient for said activation of a cyanine dye of the formula:



wherein $X^-$ is a physiologically-acceptable anion selected from the group consisting of chloride, bromide, iodide, sulfuric ion, nitric ion, perchloric ion, p-toluenesulfonic ion, acetic ion, nicotinic ion and orotic ion; $Z^+$ is a group of the formula:



R is an alkyl group having a carbon chain length of 1–5; and R' is either hydrogen atom or an alkoxy group,

said administration being carried out at a dose of about 0.1–50 μg/kg/day for said mammal.

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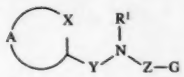
## 5,491,152
## DERIVATIVES OF CYCLIC ETHERS AND SULFIDES FOR THE TREATMENT OF ATHEROSCLEROSIS

**Richard G. Wilde, Newark; Soo S. Ko, Wilmington, both of Del., and Jeffrey T. Billheimer, West Chester, Pa., assignors to The Du Pont Merck Pharmaceutical Company, Wilmington, Del.**

**Filed Mar. 23, 1994, Ser. No. 216,723**
**Int. Cl.[6] A61K** *31/38;31/44;* **C07D** *405/12;409/12*
**U.S. Cl. 514—336** **15 Claims**

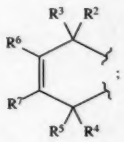
1. A compound of Formula I:



(I)

or a pharmaceutically acceptable salt form thereof, wherein:

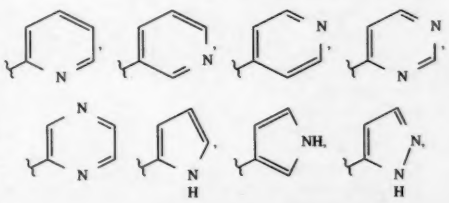
A is



X is selected from: —O—, —S—, —S(=O)—, and —$S(=O)_2$—;
Y is —C(=O)—;
Z is selected from a bond and —$(CH_2)_p$—;
p is an integer selected from 1–5;
G is selected from:

phenyl substituted with 1–3 $R^{30}$, and
naphthyl substituted with 0–3 $R^{30}$;

G may also be selected from a heterocylic group selected from:



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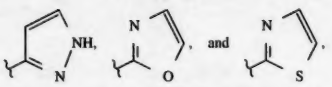
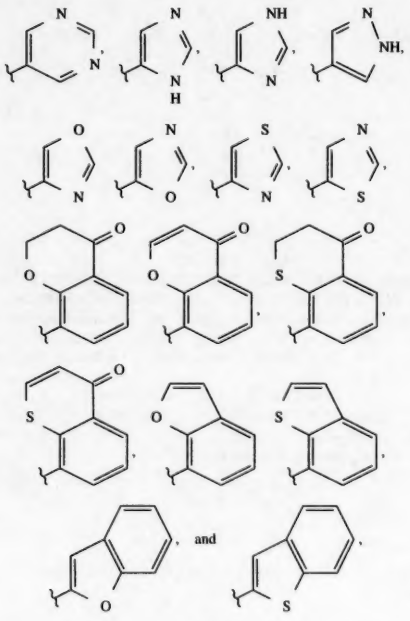


each such heterocyclic group being optionally fused to a benzene ring, and each such heterocyclic group and fused benzene ring being substituted with 0–3 $R^{30}$ or 0–3 phenyl groups, each phenyl being substituted with 0–3 $R^{30}$;

G may also be chosen from the following heterocyclic groups:



each such heterocyclic group being substituted with 0–3 $R^{30}$ or 0–3 phenyl groups, each phenyl being substituted with 0–3 $R^{30}$;

$R^1$ is selected from:
H,
$C_1$–$C_6$ alkyl,
$C_3$–$C_8$ cycloalkyl,
$C_4$–$C_9$ cycloalkylalkyl,
benzyl substituted with 0–3 $R^{30}$, and
phenyl substituted with 0–3 $R^{30}$;

$R^2$, $R^3$, $R^4$, $R^5$, $R^6$, and $R^7$ are independently selected from:
H,
$C_1$–$C_{13}$ alkyl,
$C_3$–$C_8$ cycloalkyl,
$C_3$–$C_8$ cycloalkyloxy,
$C_4$–$C_9$ cycloalkylalkyl,
$C_4$–$C_9$ cycloalkylalkyloxy,
$C_4$–$C_{12}$ alkenyl,
$C_4$–$C_{12}$ alkenyloxy,
$C_4$–$C_{12}$ alkynyl,
$C_4$–$C_{12}$ alkynyloxy,
$C_1$–$C_{10}$ alkoxy,
$C_2$–$C_{12}$ alkoxyalkyl,
$C_2$–$C_{12}$ alkoxyalkyloxy,
$C_3$–$C_{14}$ alkoxyalkoxyalkyl,
$C_2$–$C_{10}$ alkylcarbonyloxy,
$C_1$–$C_{10}$ alkylthio,
$C_2$–$C_{10}$ alkylthioalkyl,
$C_1$–$C_{10}$ haloalkyl,
aryl-($C_1$–$C_5$ alkyl)-substituted with 0–3 $R^{30}$,
aryl-($C_1$–$C_5$ alkyl)oxy substituted with 0–3 $R^{30}$,
aryl substituted with 0–3 $R^{30}$, and
aryloxy substituted with 0–3 $R^{30}$;

$R^3$ and $R^4$ can also be taken together to form a $-(CH_2)_q-$ bridge;

q is an integer selected from 1–4;

$R^{30}$ is selected independently from: $C_1$–$C_{10}$ alkyl, $C_3$–$C_{10}$ cycloalkyl, $C_4$–$C_9$ cycloalkylalkyl, $C_1$–$C_4$ alkoxy, $C_1$–$C_4$ alkylthio, $C_2$–$C_8$ dialkylamino, halogen, $C_1$–$C_6$ haloalkyl, and nitro.

**11**. A method of treating hypercholesterolemia or atherosclerosis in a mammal in need thereof comprising administering to the mammal a therapeutically effective amount of a compound of claim **1**.

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**5,491,153**

## 3-AMIDOINDOLYL DERIVATIVE

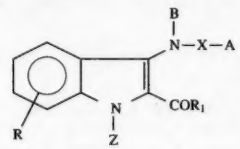
**Francesco G. Salituro, Fairfield, and Bruce M. Baron, Cincinnati, both of Ohio, assignors to Merrell Dow Pharmaceuticals Inc., Cincinnati, Ohio**

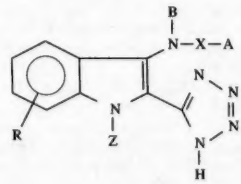
**Continuation of Ser. No. 197,101, Feb. 15, 1994, abandoned, which is a continuation of Ser. No. 977,974, Nov. 18, 1992, abandoned, which is a division of Ser. No. 795,572, Nov. 21, 1991, Pat. No. 5,189,054, which is a continuation-in-part of Ser. No. 608,457, Nov. 2, 1990, abandoned. This application Jan. 13, 1995, Ser. No. 372,710**

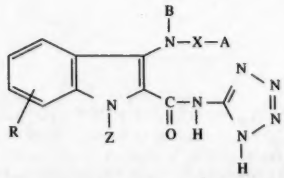
**Int. Cl.**[6] **A01N** *43/40*

**U.S. Cl. 514—339** **19 Claims**

**1**. A compound of the formula:

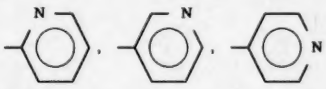



in which Z is represented by H, $C_1$–$C_4$ alkyl, phenyl, substituted phenyl in which the phenyl ring may be optionally substituted with up to 3 substituents, wherein each substituent is independently selected from the group consisting of halogen, $C_1$–$C_4$ alkyl, $C_1$–$C_4$ alkoxy, $CF_3$, $OCF_3$, OH, CN, $NH_2$ and $NO_2$, or a phenylalkyl substituent in which the phenyl ring may be optionally substituted with up to 3 substituents, wherein each substituent is independently selected from the group consisting of halogen, $C_1$–$C_4$ alkyl, $C_1$–$C_4$ alkoxy, $CF_3$, $OCF_3$, OH, CN, $NH_2$ and $NO_2$: R is represented by hydrogen, halogen, $C_1$–$C_4$ alkyl, $C_1$–$C_4$ alkoxy, $CF_3$, $OCF_3$, OH, $NO_2$ or CN; B is represented by hydrogen, $C_1$–$C_4$ alkyl, phenylalkyl substituent in which the phenyl ring may be optionally substi-

tuted with up to 3 substituents, wherein each substituent is independently selected from the group consisting of halogen, $C_1$–$C_4$ alkyl, $C_1$–$C_4$ alkoxy, $CF_3$, $OCF_3$, OH, CN, $NH_2$ and $NO_2$, or $—CH_2—COR_2$; X is represented by CO or $SO_2$; A is represented by a substituent selected from the group consisting of:



$R_1$ and $R_2$ are each independently represented by a substituent selected from the group consisting of —OH, $—OR_3$, $—NR_4R_5$, $—OCH_2OR_3$, and $—O—(CH_2)_m—NR_6R_7$, in which m is an integer from 1–4; $R_3$ is represented by $C_1$–$C_4$ alkyl, phenyl, substituted phenyl in which the phenyl ring may be optionally substituted with up to 3 substituents, wherein each substituent is independently selected from the group consisting of halogen, $C_1$–$C_4$ alkyl, $C_1$–$C_4$ alkoxy, $CF_3$, $OCF_3$, OH, CN, $NH_2$ and $NO_2$ or an phenylalkyl substituent in which the phenyl ring may be optionally substituted with up to 3 substituents, wherein each substituent is independently selected from the group consisting of halogen, $C_1$–$C_4$ alkyl, $C_1$–$C_4$ alkoxy, $CF_3$, $OCF_3$, OH, CN, $NH_2$ and $NO_2$; $R_4$ and $R_5$ are each independently represented by hydrogen or a $C_1$–$C_4$ alkyl; $R_6$ and $R_7$ are each independently represented by hydrogen or a $C_1$–$C_4$ alkyl; and the pharmaceutically acceptable salts thereof, with the proviso that with respect to a substituted phenyl ring, there may not be more than one $NH_2$ or $NO_2$ nor both an alkoxy and a hydroxy on any one phenyl ring.

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**5,491,154**

## PHARMACEUTICAL PREPARATION FOR THE ORAL ADMINISTRATION OF DIHYDROPYRIDINES

**Silvana Ciceri, Como; Gilberto Dondi, Cusano Milanino, and Paolo Scurati, Milan, all of, Italy, assignors to Bayer S.P.A., Milan, Italy**

**Filed Jul. 29, 1993, Ser. No. 99,288**

**Claims priority, application Italy, Aug. 5, 1992, MI92A1930**

**Int. Cl.[6] A61K** *31/44;* **C07D** *211/90;213/55*

**U.S. Cl. 514—356** **1 Claim**

1. A pharmaceutical composition which consists essentially of

| | | |
|---|---|---|
| Coprecipitate of nimodipine:PVP 25 (1:3) | | 120.0 mg |
| Citric acid | | 800.0 mg |
| Na bicarbonate | | 800.0 mg |
| Citrus Flavouring | | 50.0 mg |
| Orange granules | q.s. to | 3.5 g |

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**5,491,155**

## SUBSTITUTED THIADIAZOLES, COMPOSITIONS CONTAINING THEM AND THEIR USE AS ANTIMICROBIAL AND MARINE ANTIFOULING AGENTS

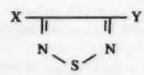
**Ravi B. Shankar; R. Garth Pews, and Duane R. Romer, all of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.**

**Filed Dec. 21, 1994, Ser. No. 360,497**

**Int. Cl.[6] A61K** *31/41;* **A01N** *43/832;* **C07D** *285/10*

**U.S. Cl. 514—362** **45 Claims**

1. A compound corresponding to the formula



wherein X and Y independently represent —Br, —Cl, $—OCH_3$, —SCN, $—OCH_2SCN$, $—SCH_2SCN$, $—OCH_2CH_2SCN$ or $—SCH_2CH_2SCN$, provided that at least one of X or Y represents —SCN, $—OCH_2SCN$, $—SCH_2SCN$, $—OCH_2CH_2SCN$ or $—SCH_2CH_2SCN$.

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**5,491,156**

## BENZOXAZOLE, BENZOTHIAZOLE AND BENZIMIDAZOLE DERIVATIVES AS FUNGICIDES

**Streeting, deceased Ian T., late of Wokingham, England, and Paul A. Worthington, Maidenhead, England, assignors to Zeneca Limited, London, United Kingdom**

**PCT No. PCT/GB92/01860, § 371 Date Feb. 16, 1994, § 102(e) Date Feb. 16, 1994, PCT Pub. No. WO93/08180, PCT Pub. Date Apr. 29, 1993**

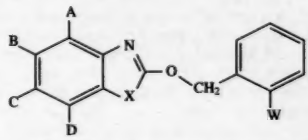
**PCT Filed Oct. 12, 1992, Ser. No. 196,265**

**Claims priority, application United Kingdom, Jan. 17, 1991, 9122098**

**Int. Cl.[6] C07D** *277/68;* **A01N** *43/78*

**U.S. Cl. 514—367** **10 Claims**

1. A compound having the general formula (I):



(I)

and stereoisomers thereof, in which A, B, C and D are independently H, halo, $C_{1-4}$ alkyl, $C_{2-4}$ alkenyl, $C_{2-4}$ alkynyl, $C_{1-4}$ alkoxy, $C_{1-4}$ alkylthio, cyano, nitro, $C_{1-4}$ haloalkyl, phenyl, phenoxy, benzyl or benzyloxy, the phenyl moieties of any of the foregoing being optionally substituted with one or more of halo, $C_{1-4}$ alkyl, $C_{1-4}$ alkoxy, nitro or cyano; X is oxygen, sulphur or NR, in which R is H or $C_{1-4}$ alkyl; and W is $CH_3CH{=}C.CO_2CH_3$ or $CH_3O.N{=}C.CONR^1R^2$, in which $R^1$ and $R^2$ are independently H or methyl.

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**5,491,157**

## METHOD AND COMPOSITION FOR THE PREVENTION, CONTROL AND AMELIORATION OF SOILBORNE FUNGI AND DISEASE CAUSED THEREBY

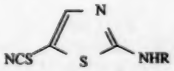
**V. James Spadafora, Morrisville, Pa.; Thomas E. Brady, Hunterdon County, Readington Township, N.J., and Masatoshi Motoyoshi, Toyohashi, Japan, assignors to Eastman Kodak Company, Rochester, N.Y.**

**Filed May 10, 1993, Ser. No. 59,690**

**Int. Cl.[6] A01N** *43/78*

**U.S. Cl. 514—369** **18 Claims**

1. A method for the control or amelioration of soilborne phytopathogenic fungi which comprises directly contacting said fungi in the soil with a fungicidally effective amount of a compound of formula I



(I)

wherein R is hydrogen, $CXR_1$ or $C_1$–$C_8$ alkyl optionally substituted with one or more halogen or $C_1$–$C_4$ alkoxy groups;

X is oxygen or sulfur;

$R_1$ is hydrogen, $C_1$–$C_4$ alkoxy optionally substituted with one or more halogens, $C_1$–$C_8$alkyl optionally substituted with one or more halogens, $C_1$–$C_4$ alkoxy or phenyl optionally substituted substituted with one to three halogen, $C_1$–$C_4$ alkyl or $C_1$–$C_4$ alkoxy groups or

phenyl optionally substituted with one to three halogen, halogen, $C_1$–$C_4$ alkyl or $C_1$–$C_4$ alkoxy groups.

## 5,491,158
## THIOSEMICARBAZONETHIONES

**Martin Missbach, Rheinfelden, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.**

**PCT No. PCT/EP93/02607, § 371 Date May 16, 1994, § 102(e) Date May 16, 1994, PCT Pub. No. WO94/07874, PCT Pub. Date Apr. 14, 1994**

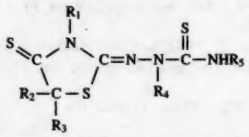
**PCT Filed Sep. 25, 1993, Ser. No. 244,081**

**Claims priority, application Switzerland, Jan. 6, 1992, 03113/92**

**Int. Cl.[6] C07D** *277/54;* **A61K** *31/425*

**U.S. Cl. 514—369** **10 Claims**

1. A compound of formula I,



(I)

wherein $R_1$ is $C_1$–$C_4$alkyl, $C_3$–$C_5$alk-2-en-1-yl or $C_3$–$C_5$alk-2-yn-1-yl, $R_2$ and $R_3$ are each independently of the other hydrogen, identical $C_1$–$C_4$alkyl or $C_1$–$C_4$alkylidene groups, and $R_4$ is hydrogen, $C_1$–$C_4$alkyl, $C_1$–$C_2$alkoxy, phenyl or phenyl-lower alkyl, $R_5$ is $C_1$–$C_4$alkyl, phenyl, naphthyl, phenyl-lower alkyl, pyridyl-lower alkyl, thienyl-lower alkyl, pyrryl-lower alkyl, imidazolyl-lower alkyl, pyrrolidinyl-lower alkyl, tetrahydrofuranyl-lower alkyl or tetrahydropyranyl-lower alkyl or $C_1$–$C_4$alkoxycarbonyl-$C_1$–$C_4$alkyl, or a pharmaceutically acceptable salt thereof.

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## 5,491,159
## 2-(3,5-DI-TERT-BUTYL-4-HYDROXY-PHENYL)-OXAZOLES AS ANTI-ATHEROSCLEROTIC AGENTS

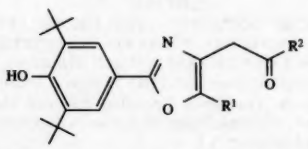
**Michael S. Malamas, Jamison, Pa., assignor to American Home Products Corporation, Madison, N.J.**

**Filed Aug. 30, 1994, Ser. No. 298,519**

**Int. Cl.[6] A61K** *31/42*

**U.S. Cl. 514—374** **11 Claims**

1. A compound having the formula:



I

wherein:

$R^1$ is hydrogen, $C_1$–$C_6$ alkyl, phenyl or naphthyl;

$R^2$ is OH $NH_2$, $OR^3$, or $NHCO_2R^4$ wherein

$R^3$ and $R^4$ are independently selected from $C_1$–$C_6$ alkyl, phenyl or naphthyl; or a pharmaceutically acceptable salt thereof.

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## 5,491,160
## PESTICIDAL METHODS AND COMPOSITIONS EMPLOYING A TRIAZOLE AND A PYRETHROID

**Robert J. Knight, Rainham, and David P. Highwood, Sittingbourne, both of, England, assignors to American Cyanamid Co., Madison, N.J.**

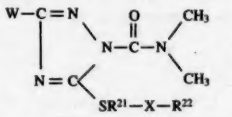
**Filed Oct. 4, 1994, Ser. No. 318,014**

**Claims priority, application European Pat. Off., Jan. 7, 1993, 93307974**

**Int. Cl.[6] A01N** *37/34;43/64*

**U.S. Cl. 514—384** **15 Claims**

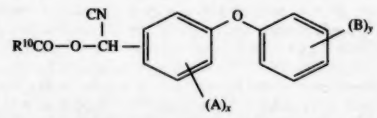
1. A pesticidal composition which comprises synergistic effective amount of a substituted 1,2,4-triazole compound and a pyrethroid insecticide, wherein said substituted 1,2,4-triazole formula is a 1-dimethylcarbamoyl-3-substituted-5-substituted -1H-1,2,4-triazole of formula



(I)

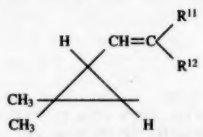
wherein $R^{21}$ is —$CH_2$—, —$CH_2CH_2$—, —$CH_2CH_2CH_2$— or —$CH(CH_3)$—; X i

; $R^{22}$ is ($C_{1-4}$)alkyl; and W is t-butyl; and agronomically acceptable salts thereof, and said pyrethroid insecticide is of formula



(II)

where A and B independently represent a halogen atom; x is 0, 1 or 2, y is 0, 1 or 2; and $R^{10}$ represents a group of formula



(III)

where $R^{11}$ and $R^{12}$ independently represent a halogen atom.

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## 5,491,161
## PYRROLOIMIDAZOLYL AND IMIDAZOPYRIDINYL SUBSTITUTED 1H-BENZIMIDAZOLE DERIVATIVES

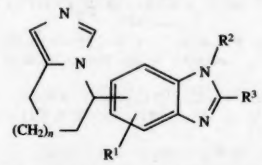
**Marcel A. C. Janssen, Vosselaar; Alfons H. M. Raeymaekers, Beerse; Eddy J. E. Freyne, Rumst, all of, Belgium, and Michael N. Greco, Lansdale, Pa., assignors to Janssen Pharmaceutica N.V., Beerse, Belgium**

**Division of Ser. No. 256,465, Jul. 7, 1994, Pat. No. 5,457,102, which is a continuation-in-part of Ser. No. 826,564, Jan. 27, 1992, abandoned. This application May 25, 1995, Ser. No. 450,966**

**Int. Cl.[6] A61K** *31/535;31/495;31/435;31/415*

**U.S. Cl. 514—394** **4 Claims**

1. A method of inhibiting the action of the enzymes 17-hydroxyl-/17,20-lyase and aromatase in mammals, which method comprises administering to said mammals a therapeutically effective amount of a compound of the formula:



(I)

a pharmaceutically acceptable acid addition salt thereof or a stereochemically isomeric form thereof, wherein:

n is 0 or 1;

$R^1$ is hydrogen, nitro, amino, mono-or di($C_{1-6}$alkyl)amino, halo, $C_{1-6}$alkyl, hydroxy, or $C_{1-6}$alkyloxy;

$R^2$ is hydrogen; $C_{1-10}$alkyl; $C_{3-6}$alkenyl, $C_{3-6}$alkynyl, $C_{3-7}$cycloalkyl; phenyl; substituted phenyl; $C_{1-4}$alkyl substi-

tuted with phenyl, substituted phenyl, naphthenyl, thienyl, furanyl, $C_{1-4}$alkylfuranyl, or $C_{3-7}$cycloalkyl; and

$R^3$ is hydrogen; $C_{1-8}$alkyl; $C_{3-7}$cycloalkyl; hydroxy; amino; $C_{1-6}$alkyloxy; $C_{1-6}$alkyloxycarbonylamino; phenyl; $C_{1-4}$alkyl substituted with phenyl, piperazinyl, 4-($C_{1-4}$alkyl)piperazinyl, or morpholinyl;

wherein each substituted phenyl independently is phenyl substituted with a substituted independently selected from the group consisting of halo, hydroxy, hydroxymethyl, trifluoromethyl, $C_{1-6}$alkyl, $C_{1-6}$alkyloxy, $C_{1-6}$alkyloxycarbonyl, carboxyl, formyl, (hydroxyimino)methyl, cyano, amino, mono- and di($C_{1-6}$alkyl)amino and nitro.

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## 5,491,162

## N-ACYLATED PYRAZOLINES, COMPOSITIONS AND USE

**Mohamed A. H. Fahmy, Wilmington; Charles R. Harrison, Newark; George P. Lahm, Wilmington, and Thomas M. Stevenson, Newark, all of Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

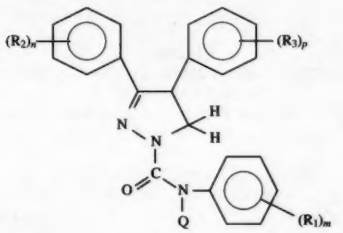
**Continuation of Ser. No. 4,860, Jan. 15, 1993, abandoned, which is a division of Ser. No. 659,402, Mar. 12, 1991, Pat. No. 5,196,408, which is a continuation-in-part of Ser. No. 304,011, Jan. 25, 1989, abandoned, Ser. No. 249,881, Sep. 27, 1988, abandoned, and Ser. No. 249,882, Sep. 27, 1988, abandoned. This application Jul. 22, 1994, Ser. No. 279,377**

**Int. Cl.**[6] **A01N** *43/56;* **C07D** *231/06*

**U.S. Cl. 514—403** **6 Claims**

1. A compound of the formula:

I



wherein

$R_1$, is selected from halogen, $C_1$–$C_6$ haloalkyl and $C_1$–$C_6$ haloalkoxy;

$R_2$ is halogen;

$R_3$ is selected from H, CN, and halogen;

m, n and p are each 1; and

Q is $C_2$ to $C_6$ alkoxycarbonyl, or phenoxycarbonyl.

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## 5,491,163

## (THIA)CYCLOALKYL[B]INDOLES

**Paul Caubere, Nancy; Brigitte Jamart-Gregoire, Vandoeuvre les Nancy; Catherine Caubere, Nancy; Jean-Guy Bizot-Espiard, Paris; Pierre Renard, Versailles, and Gérard Adam, Le Mesnil le Roi, all of, France, assignors to Adir et Compagnie, Courbevoie, France**

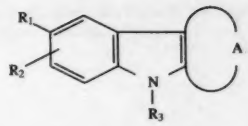
**Filed Jul. 19, 1994, Ser. No. 276,917**

**Claims priority, application France, Jul. 20, 1993, 93 08862; May 19, 1994, 94 06098**

**Int. Cl.**[6] **A61K** *31/40;* **C07D** *513/04*

**U.S. Cl. 514—411** **15 Claims**

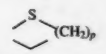
1. A compound selected from those of formula (I):



(I)

in which:

A denotes an alkylene chain —($CH_2$)m— with m denoting 5 or 6 or a group of formula (a)



(a)

in which p is 1 to 4, inclusive

$R_1$ denotes a radical chosen from:

hydroxyl,

thiol,

—O—$R_4$ with $R_4$ being chosen from alkyl and acyl;

and —S—$R_5$ with $R_5$ being chosen from alkyl, phenyl and benzyl;

$R_2$ denotes a radical chosen from hydrogen, halogen, alkyl, alkoxy and trifluoromethyl;

$R_3$ denotes a radical chosen from acyl, carboxyalkyl and alkoxycarbonylalkyl; and, in the case where A is other than ($CH_2$)m— also hydrogen oralkyl;

its optical isomers, in pure form or in mixed form, when $R_1$, $R_2$ or $R_3$ have a chiral center,

and its addition salts with a pharmaceutically-acceptable base, it being understood that the terms "alkyl", "alkoxy" and "acyl" denote linear or branched groups containing 1 to 6 carbon atoms, inclusive.

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## 5,491,164

## INHIBITORS OF FARNESYL-PROTEIN TRANSFERASE

**S. Jane deSolms, Norristown, and Samuel J. Graham, Schwenksville, both of Pa., assignors to Merck & Co., Inc., Rahway, N.J.**

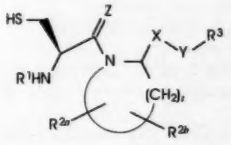
**Filed Sep. 29, 1994, Ser. No. 315,151**

**Int. Cl.**[6] **A61K** *38/05;* **C07D** *207/06;207/08;207/09*

**U.S. Cl. 514—423** **18 Claims**

1. A compound which inhibits Ras farnesyl-transferase having the formula I:

I



wherein:

$R^1$ is selected from:

a) hydrogen,

b) $R^5S(O)_2$—, $R^5C(O)$—, $(R^5)2NC(O)$— or $R^6OC(O)$—, and

c) $C_1$–$C_6$ alkyl unsubstituted or substituted by aryl, heterocyclic, cycloalkyl, alkenyl, alkynyl, $R^5O$—, $R^5S(O)_m$—, $R^5C(O)NR^5$—, CN, $(R^5)_2N$—$C(NR^5)$—, $R^5C(O)$—, $R^5OC(O)$—, $N_3$, —$N(R^5)_2$, or $R^6OC(O)NR^5$—;

$R^{2a}$ and $R^{2b}$ are independently selected from:

a) hydrogen,

b) $C_1$–$C_6$ alkyl unsubstituted or substituted by aryl, heterocycle, cycloalkyl, alkenyl, $R^5O$—, $R^5S(O)_m$—, $R^5C(O)NR^5$—, CN, $(R^5)_2N$—$C(NR^5)$—, $R^5C(O)$—, $R^5OC(O)$—, $N_3$, —$N(R^5)_2$, or $R^6OC(O)NR^5$—, and

c) aryl, heterocycle, cycloalkyl, alkenyl, $R^5O$—, $R^5S(O)_m$—, $R^5C(O)NR^5$—, CN, $NO_2$, $(R^5)_2N$—$C(NR^5)$—, $R^5C(O)$—, $R^5OC(O)$—, $N_3$, —$N(R^5)_2$, or $R^6OC(O)NR^5$—,

$R^3$ is selected from:

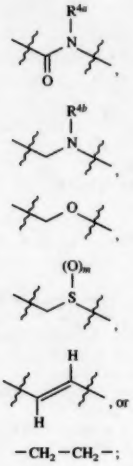
a) unsubstituted or substituted aryl,

b) unsubstituted or substituted heterocycle,

c) unsubstituted or substituted cycloalkyl, and

d) $C_1$–$C_6$ alkyl substituted with hydrogen or an unsubstituted or substituted group selected from aryl, heterocycle and cycloalkyl;

X-Y is




$-CH_2-CH_2-$;

$R^{4a}$ is selected from

a) hydrogen,

b) unsubstituted or substituted aryl,

c) unsubstituted or substituted heterocycle,

d) unsubstituted or substituted cycloalkyl, and

e) $C_1$–$C_6$ alkyl substituted with hydrogen or an unsubstituted or substituted group selected from aryl, heterocycle and cycloalkyl;

$R^{4b}$ is selected from

a) hydrogen,

b) unsubstituted or substituted aryl,

c) unsubstituted or substituted heterocycle,

d) unsubstituted or substituted cycloalkyl,

e) $C_1$–$C_6$ alkyl substituted with hydrogen or an unsubstituted or substituted group selected from aryl, heterocycle and cycloalkyl,

f) a carbonyl group which is bonded to an unsubstituted or substituted group selected from aryl, heterocycle, cycloalkyl and $C_1$–$C_6$ alkyl substituted with hydrogen or an unsubstituted or substituted group selected from aryl, heterocycle and cycloalkyl, and

g) a sulfonyl group which is bonded to an unsubstituted or substituted group selected from aryl, heterocycle, cycloalkyl and $C_1$–$C_6$ alkyl substituted with hydrogen or an unsubstituted or substituted group selected from aryl, heterocycle and cycloalkyl;

$R^5$ is independently selected from hydrogen, $C_1$–$C_6$ alkyl and aryl;

$R^6$ is independently selected from $C_1$–$C_6$ alkyl and aryl;

Z is $H_2$;

m is 0, 1 or 2, provided that m is 0 when $R^5$=hydrogen;

n is 0, 1, 2, 3 or 4; and

t is 3;

or a pharmaceutically acceptable salt thereof.

**5,491,165**

## FUNGICIDAL ACTIVE COMPOUND COMBINATIONS

**Heinz-Wilhelm Dehne, Monheim; Wilhelm Brandes, Leichlingen; Karl-Heinz Kuck, and Thomas Seitz, both of Langenfeld, all of, Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany**

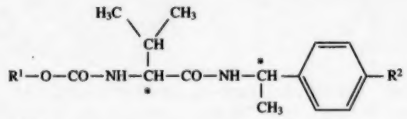
**Filed Feb. 4, 1994, Ser. No. 192,333**

**Claims priority, application Germany, Feb. 12, 1993, 43 04 172.8**

**Int. Cl.[6] A01N** *37/34;47/10*

**U.S. Cl. 514—479** **8 Claims**

1. A fungicidal composition comprising synergistic effective amounts of a valinamide derivative of the formula

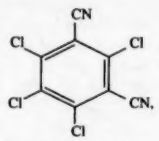



(I)

in which

$R^1$ is i-propyl or s-butyl and

$R^2$ is chlorine, methyl, ethyl or methoxy, tetrachloro-isophthalonitrile of the formula




(IV)

(CHLOROTHALONIL).

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**5,491,166**

## INHIBITORS OF HIV PROTEASE USEFUL FOR THE TREATMENT OF AIDS

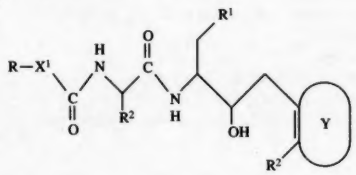
**Stephen W. Kaldor, and Thomas E. Mabry, both of Indianapolis, Ind., assignors to Eli Lilly and Company, Indianapolis, Ind.**

**Filed Dec. 22, 1992, Ser. No. 995,283**

**Int. Cl.[6] A61K** *31/17;31/27*

**U.S. Cl. 514—481** **12 Claims**

1. A compound of formula I




wherein:

R is naphthyl;

$X^1$ is $-(CH_2)_n-$, $-(CH_2)_m-O-(CH_2)_n-$ or $-(CH_2)_m-NR^0-(CH_2)_n-$, where

m and n are independently **0**, **1** or **2**;

$R^0$ is hydrogen or $C_1$–$C_4$ alkyl;

$R^1$ is phenyl;

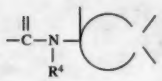
$R^2$ is cyno($C_1$–$C_4$)alkyl

Y is phenyl;

$R^3$ is a group having the structure:

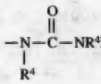
$-C(O)-NR^4R^4$, 1)

-continued



2)

3)



5)

where

p is 4 or 5;

$R^4$ at each occurrence is independently hydrogen, $C_1$–$C_6$ alkyl or hydroxy($C_1$–$C_4$)alkyl;

$R^5$ and $R^6$ are independently selected from hydrogen, hydroxy, $C_1$–$C_6$ alkyl, $C_1$–$C_6$ alkoxy, amino, $C_1$–$C_4$ alkylamino, hydroxy($C_1$–$C_4$)alkyl, carboxy, $C_1$–$C_4$ alkoxycarbonyl, carbamoyl, N-($C_1$–$C_4$)alkylcarbamoyl, and aryl; or a pharmaceutically acceptable salt thereof.

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**5,491,167**

## HEXAHYDRONAPHTHALENE ESTER DERIVATIVES, THEIR PREPARATION AND THEIR THERAPEUTIC USES

**Sadao Ishihara; Hiroshi Kogen; Teiichiro Koga; Eiichi Kitazawa, and Nobufusa Serizawa, all of Tokyo, Japan, assignors to Sankyo Company, Limited, Tokyo, Japan**

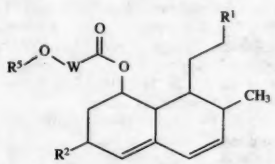
**Filed Jan. 31, 1994, Ser. No. 189,040**

**Claims priority, application Japan, Jan. 29, 1993, 5-13063**

**Int. Cl.[6] A61K** *31/75;* **C07C** *69/013*

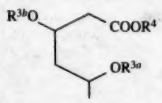
**U.S. Cl. 514—510** **87 Claims**

1. A compound of formula (I):



(I)

wherein $R^1$ represents a group of formula (II):



(II)

$R^2$ represents a hydrogen atom or a group of formula —$OR^3$;

$R^3$, $R^{3a}$ and $R^{3b}$ are independently selected from the group consisting of hydrogen atoms, hydroxy-protecting groups, alkyl groups having from 1 to 6 carbon atoms, alkanesulfonyl groups having from 1 to 6 carbon atoms, halogenated alkanesulfonyl groups having from 1 to 6 carbon atoms and arylsulfonyl groups, in which the aryl part is an aromatic hydrocarbon ring which has from 6 to 14 ring carbon atoms and is unsubstituted or is substituted by at least one substituent selected from the group consisting of substituents α, defined below;

$R^4$ represents a hydrogen atom or a carboxy-protecting group;

$R^5$ represents an aryl group having from 6 to 14 ring carbon atoms; an aryl group having from 6 to 14 ring carbon atoms and substituted by at least one substituent selected from the group consisting of substituents α, defined below; an aralkyl group in which the or each aryl portion has from 6 to 14 ring carbon atoms, and the alkyl portion has from 1 to 6 carbon atoms; or an aralkyl group, in which the or each aryl portion has from 6 to 14 ring carbon atoms, and the alkyl portion has from 1 to 6 carbon atoms, substituted on the ring by at least one substituent selected from the group consisting of substituents α, defined below; and

W represents an alkylene group having from 1 to 6 carbon atoms, or an alkylene group having from 1 to 6 carbon atoms and substituted by at least one substituent selected from the group consisting of substituents β, defined below;

said substituents α are selected from the group consisting of alkyl groups having from 1 to 6 carbon atoms;

said substituents β are selected from the group consisting of alkyl groups having from 1 to 6 carbon atoms;

wherein said hydroxy protecting group is selected from the group consisting of: methoxymethyl, ethoxymethyl, propoxymethyl, isopropoxymethyl, butoxymethyl, t-butoxymethyl, 2-methoxyethoxymethyl, 2,2,2-trichloroethoxymethyl, bis(2-chloroethoxy)methyl, 1-ethoxyethyl, 1-methyl-1-methoxyethyl, 1-isopropoxyethyl, 2,2,2-trichloroethyl, 2-(phenylselenyl)ethyl, acetoxymethyl, dimethylaminoacetoxy methyl, propionyloxymethyl, butyryloxymethyl, isobutyryloxymethyl, pivaloyloxymethyl, 1-pivaloyloxyethyl, 1-acetoxyethyl, 1-isobutyryloxyethyl, 1-pivaloyloxypropyl, 2-methyl-1-pivaloyloxypropyl, 2-pivaloyloxypropyl, 1-isobutyryloxyethyl, 1-isobutyryloxypropyl, 1-acetoxypropyl, 1-acetoxy-2-methylpropyl, 1-propionyloxyethyl, 1-propionyloxypropyl, 2-acetoxypropyl, 1-butyryloxyethyl, 1-(alkoxycarbonyloxy)ethyl, methoxycarbonyloxymethyl, ethoxycarbonyloxymethyl, propoxycarbonyloxymethyl, isopropoxycarbonyloxymethyl, butoxycarbonyloxymethyl, isobutoxycarbonyloxy methyl, 1-methoxycarbonyloxyethyl, 1-ethoxy carbonyloxyethyl, 1-propoxycarbonyloxyethyl, 1-isopropoxycarbonyloxyethyl, 1-butoxycarbonyloxyethyl, 1-isobutoxycarbonyloxyethyl, 1-sec-butoxycarbonyloxyethyl, 1-t-butoxycarbonyloxyethyl, 1-(1-ethylpropoxycarbonyloxy)ethyl, 1-(1,1-dipropylbutoxycarbonyloxy)ethyl, 2-methyl-1-(isopropoxycarbonyloxy)propyl, 2-(isopropoxycarbonyloxy)propyl, isopropoxycarbonyloxymethyl, t-butoxycarbonyloxymethyl, methoxycarbonyloxymethyl, ethoxycarbonyloxymethyl, cyclohexyloxycarbonyloxymethyl, 1-methylcyclohexylcarbonyloxymethyl, 1-methylcyclohexyloxycarbonyloxymethyl, cyclopentyloxycarbonyloxymethyl, cyclopentylcarbonyloxymethyl, 1-cyclohexyloxycarbonyloxyethyl, 1-cyclohexylcarbonyloxyethyl, 1-cyclopentyloxycarbonyloxyethyl, 1-cyclopentylcarbonyloxyethyl, 1-cycloheptyloxycarbonyloxyethyl, 1-cycloheptylcarbonyloxyethyl, 1-methylcyclopentylcarbonyloxymethyl, 1-methylcyclopentyloxycarbonyloxymethyl, 2-methyl-1-(1-methylcyclohexylcarbonyloxy)propyl, 1-(1-methylcyclohexylcarbonylony)propyl, 2-(1-methylcyclohexylcarbonyloxy)propyl, 1-(cyclohexylcarbonyloxy)propyl, 2-(cyclohexylcarbonyloxy)propyl, 2-methyl-1-(1-methylcyclopentylcarbonyloxy)propyl, 1-(1-methylcyclopentylcarbonyloxy)propyl, 2-(1-methylcyclopentylcarbonyloxy)propyl, 1-(cyclopentylcarbonyloxy)propyl, 2-(cyclopentylcarbonyloxy)propyl, 1-(1-methylcyclopentylcarbonyloxy)ethyl, 1-(1-methylcyclopentylcarbonyloxy)propyl, adamantyloxycarbonyloxymethyl, adamantylcarbonyloxymethyl, 1-adamantyloxycarbonyloxyethyl, 1-adamantylcarbonyloxyethyl, cyclohexyloxycarbonyloxy(cyclohexyl)methyl, (cyclohexyl-acetoxy)methyl, 1-(cyclohexylacetoxy)ethyl, 1-(cyclohexylacetoxy)propyl, 2-methyl-1-(cyclohexylacetoxy)propyl, (cyclopentylacetoxy)methyl, 1-(cyclopentylacetoxy)ethyl, 1-(cyclopentylacetoxy)propyl, 2-methyl-1-(cyclopentylacetoxy)propyl, cyclopropylmethoxycarbony-

loxymethyl, cyclobutylmethoxycarbonyloxymethyl, cyclopentylmethoxycarbonyloxymethyl, cyclohexylmethoxycarbonyloxymethyl, 1-(cyclopropylmethoxycarbonyloxy)ethyl, 1-(cyclobutylmethoxycarbonyloxy)ethyl, 1-(cyclopentylmethoxycarbonyloxy)ethyl, 1-(cyclohexylmethoxycarbonyloxy)ethyl, 1-(menthyloxycarbonyloxy)ethyl, 1-(menthylcarbonyloxy)ethyl, menthyloxycarbonyloxymethyl, menthylcarbonyloxymethyl, 1-(3-pinanyloxycarbonyloxy)ethyl, 1-(3-pinanylcarbonyloxy)ethyl, 3-pinanyloxycarbonyloxymethyl, 3-pinanylcarbonyloxymethyl, (5-methyl-2-oxo-1,3-dioxolen-4-yl)methyl, (5-phenyl-2-oxo-1,3-dioxolen-4-yl)methyl, (5-isopropyl-2-oxo-1,3-dioxolen-4-yl)methyl, (5-t-butyl-2-oxo-1,3-dioxolen-4-yl)methyl, 1-(5-methyl-2-oxo-1,3-dioxolen-4-yl)ethyl, phthalidyl, dimethylphthalidyl, dimethoxyphthalidyl, carboxymethyl and phenylalanine;

said carboxy-protecting groups are groups which can be cleaved by chemical means or in vivo by biological means and wherein

said carboxy-protecting groups which can be cleaved by chemical means are selected from the group consisting of

alkyl groups having from 1 to 20 carbon atoms;

halogenated alkyl groups having from 1 to 6 carbon atoms, and wherein the halogen atom is chlorine, fluorine, bromine or iodine;

cycloalkyl groups having from 3 to 7 carbon atoms,

aralkyl groups, in which the alkyl part has from 1 to 3 carbon atoms and the or each aryl part is a carbocyclic aromatic group having from 6 to 14 carbon atoms, which may be substituted or unsubstituted and, if substituted, has at least one of substituents α, defined above;

aryl groups having 6 to 14 carbon atoms and being optionally substituted by one or more substituents α, defined above,

phenacyl groups optionally substituted by one or more substituents α, defined above;

terpenyl groups, selected from the group consisting of geranyl, neryl, linalyl, phytyl, menthyl, thujyl, caryl, pinanyl, bornyl, norcaryl, norpinanyl, norbornyl, menthenyl, camphenyl and norbornenyl groups; and

said carboxy-protecting group which can be cleaved in vivo by biological means is selected from the group consisting of

alkoxyalkyl groups, in which the alkoxy and alkyl parts each have from 1 to 5 carbon atoms;

halogenated ethyl groups; and arylselenyl-substituted ethyl groups, in which the aryl part is as defined above,

aliphatic acyloxyalkyl groups, in which the acyl group is an alkanoyl group having from 2 to 6 carbon atoms, and the alkyl part has from 1 to 6 carbon atoms;

alkoxycarbonyloxyalkyl groups wherein the alkoxy part has from 1 to 10 carbon atoms, and the alkyl part has from 1 to 6 carbon atoms;

cycloalkylcarbonyloxyalkyl and cycloalkyloxycarboxyloxyalkyl groups, in which the cycloalkyl group has from 3 to 10, carbon atoms, is mono- or poly-cyclic and is optionally substituted by alkyl having from 1 to 4 carbon atoms and the alkyl part has from 1 to 6 carbon atoms;

cycloalkyl-substituted aliphatic acyloxyalkyl groups, in which the acyl group is an alkanoyl group having from 2 to 6 carbon atoms, the cycloalkyl substituent has from 3 to 7 carbon atoms, and the alkyl part has from 1 to 6 carbon atoms;

cycloalkylalkoxycarbonyloxyalkyl groups selected from the group consisting of cyclopropylmethoxycarbonyloxymethyl, cyclobutylmethoxycarbonyloxymethyl, cyclopentylmethoxycarbonyloxymethyl, cyclohexylmethoxycarbonyloxymethyl, 1-(cyclopropylmethoxycarbonyloxy)ethyl, 1-(cyclobutylmethoxycarbonyloxy)ethyl, 1-(cyclopentylmethoxycarbonyloxy)ethyl and 1-(cyclohexylmethoxycarbonyloxy)ethyl groups;

terpenylcarbonyloxy(2-oxo-1,3-dioxolen-4-yl)alkyl groups in which each alkyl group, which may be the same or different has from 1 to 6 carbon atoms, and

the phthalidyl group, which may be unsubstituted or may be substituted by at least one substituent selected from the group consisting of substituents α defined above; or a pharmaceutically acceptable salt or ester thereof.

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**5,491,168**

**SYNERGISTIC INSECTICIDAL COMPOSITIONS**

**Masaaki Kataoka, Yaizu; Akira Wakai, Hadano, and Takehiko Nakamura, Haibara, all of, Japan, assignors to Uniroyal Chemical Company, Inc., Middlebury, Conn.**

**PCT No. PCT/US92/07288, § 371 Date Feb. 22, 1994, § 102(e) Date Feb. 22, 1994, PCT Pub. No. WO93/03618, PCT Pub. Date Mar. 4, 1993**

**PCT Filed Aug. 27, 1992, Ser. No. 199,233**

**Claims priority, application Japan, Aug. 27, 1991, 3-238923; Jan. 8, 1991, 3-289157**

**Int. Cl.[6] A01N** *41/02;53/00*

**U.S. Cl. 514—517** **3 Claims**

1. A composition useful for controlling *Thrips palmi* comprising synergistic insecticidally effective amounts of:

(A) 2-(4-tert-butylphenoxy)cyclohexyl prop-2-ynyl sulfite; and

(B) cypermethrin.

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**5,491,169**

**AMINO ACID DERIVATIVES AND THEIR THERAPEUTICAL APPLICATIONS**

**Bernard Roques, Saint Maurice, and Marie C. Fournie-Zaluski, Paris, both of, France, assignors to Institut National de la Sante et de la Recherche Medicale (INSERM), France**

**Continuation of Ser. No. 835,961, Feb. 18, 1992, abandoned. This application Sep. 26, 1994, Ser. No. 312,117**

**Claims priority, application France, Aug. 24, 1989, 89 11224**

**Int. Cl.[6] C07C** *321/14*

**U.S. Cl. 514—529** **20 Claims**

1. A compound of the formula

$$H_2N—CH(R_1)—CH(R_2)—S—S—CH(R_3)—CH(R_4)—A—B—Z$$

in which $R_1$ is saturated or unsaturated, linear or branched hydrocarbon chain containing from 1 to 6 carbon atoms, unsubstituted or substituted with =OR in which R is hydrogen, a linear or branched C1 to C4 hydrocarbon chain or phenyl or benzyl; =SR, R having the same definition as above, or an oxidized thioether group S(O)R, R having the same definition as above,

methylcycloalkyl of 5 to 6 carbon atoms, benzyl or phenyl optionally substituted:

with 1 to 5 halogen,

or OR' or SR', R' being an alkyl group having 1 to 4 carbon atoms, =SR' being optionally oxidized on the sulfur atom,

or with an amino group optionally mono- or disubstituted with an aliphatic of 1 to 6 carbon atoms, optionally oxidized on the amine, $R_2$ is hydrogen or methyl, $R_3$ is hydrogen or a linear or branched alkyl chain, $R_4$ is saturated or unsaturated, linear or branched hydrocarbon chain containing from 1 to 6 carbon atoms, unsubstituted or substituted with a hydroxyl group, =OR in which R has the same meaning as above, =SH, =SR thioether group oxidized to sulfoxide,

or a methylcycloalkyl group having 5 to 6 carbon atoms, a benzyl or phenyl group, optionally substituted with 1 to 5 halogen, with a hydroxyl or a thiol, =OR' or =SR', R' being alkyl of 1 to 4 carbon atoms, the thioether being optionally oxidized on the sulfur atom, with an amino group optionally mono- or disubstituted with an aliphatic of 1 to 6 carbon atoms, optionally oxidized on the amine function,

Z is $—CH(R_5)—CH(R_6)_n—COO(R_7)$ in which $R_5$ and $R_6$ are individually selected from the group consisting of hydrogen, alkyl group having 1 to 6 carbon atoms, unsubstituted or substituted with hydroxyl or =OR, =SH or =SR groups,

or a phenyl (Phe) or benzyl unsubstituted or substituted with 1 to 5 halogen atoms; =OR' or =SR', R' having the definition specified above,

$R_5$ and $R_6$ can also each represent saturated or unsaturated hydrocarbon chains containing from 1 to 6 carbon atoms in which 1 to 2 carbon atoms may be substituted by an oxygen, sulfur or nitrogen atom, capable of leading to the formation of one or more saturated or aromatic 5- to 6-membered hydrocarbon rings,

n is 0 or 1,

$R_7$ is selected from the group consisting of hydrogen, saturated or unsaturated, linear or branched alkyl group having 1 to 6 carbon atoms and benzyl, A—B represents an amide CONH or retro-amide NHCO in the forms of racemic mixtures or in the form of enantiomers, of diastereoisomers or of stereoisomers, as well as mixtures thereof and their non-toxic, pharmaceutically acceptable salts.

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**5,491,170**

## β-CARBOXY SULFONAMIDE ACAT INHIBITORS

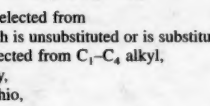
**Helen T. Lee, Ann Arbor; Joseph A. Picard, Canton, and Drago R. Sliskovic, Ypsilanti, all of Mich., assignors to Warner-Lambert Company, Morris Plains, N.J.**

**Filed Dec. 19, 1994, Ser. No. 359,115**

**Int. Cl.[6] A61K** *31/19;31/215;* **C07C** *311/25*

**U.S. Cl. 514—538** **40 Claims**

1. A compound of Formula I



I

wherein $R_1$ is selected from

(a) phenyl which is unsubstituted or is substituted with from 1 to 3 substituents selected from $C_1$–$C_4$ alkyl,

$C_1$–$C_4$ alkoxy,

$C_1$–$C_4$ alkylthio,

hydroxy,

halo,

nitro,

cyano,

trifluoromethyl,

—COOH,

—COOalkyl wherein alkyl has from 1 to 4 carbon atoms and which is straight or branched,

—$(CH_2)_mNR_xR_y$ wherein m is 0 or 1, and each of $R_x$ and $R_y$ is independently hydrogen or $C_1$–$C_4$ alkyl;

(b) 1- or 2-naphthyl which is unsubstituted or substituted with from 1 to 3 substituents selected from

$C_1$–$C_4$ alkyl,

$C_1$–$C_4$ alkoxy,

$C_1$–$C_4$ alkylthio,

hydroxy,

halo,

nitro,

cyano,

trifluoromethyl,

—COOH,

—COOalkyl wherein alkyl has from 1 to 4 carbon atoms and which is straight or branched,

—$(CH_2)_mNR_xR_y$ wherein m is 0 or 1, and each of $R_x$ and $R_y$ is independently hydrogen or $C_1$–$C_4$ alkyl;

(c) a straight or branched hydrocarbon group having from 1 to 18 carbon atoms which is saturated or is unsaturated containing one double bond or two nonadjacent double bonds; or

(d) a cycloalkyl group having from 3 to 10 carbon atoms; $R_2$ is hydrogen or a group defined as for $R_1$;

$R_3$ and $R_4$ independently are $C_3$–$C_6$ cycloalkyl, hydroxy-$C_1$–$C_4$ alkyl, $C_1$–$C_4$ alkoxy, hydrogen, $C_1$–$C_4$ alkyl, 1- or 2-naphthyl, or naphthyl substituted with from 1 to 3 substituents selected from $C_1$–$C_4$ alkyl, $C_1$–$C_4$ alkoxy, $C_1$–$C_4$ alkylthio, halo, nitro, cyano, trifluoromethyl, phenyl, or $C_3$–$C_8$ cycloalkyl; or $R_3$ and $R_4$ taken together with the carbon to which they are attached complete a $C_3$–$C_8$ carbocyclic ring;

$R_5$ is $R_6$, $C_8$–$C_{20}$ alkyl, $C_2$–$C_{20}$ alkenyl, $C_2$–$C_{20}$ alkynyl and alkyl, alkenyl and alkenyl substituted with one or two groups defined by $R_6$, where $R_6$ is $C_3$–$C_6$ cycloalkyl, phenyl, 1- or 2-naphthyl, and phenol and naphthyl substituted with from 1 to 3 substituents selected from:

$C_1$–$C_4$ alkyl,

$C_1$–$C_4$ alkoxy,

$C_1$–$C_4$ alkylthio,

phenyl,

hydroxy,

halo,

nitro,

cyano,

trifluoromethyl,

—COOH,

—COOalkyl wherein alkyl has from 1 to 4 carbon atoms and which is straight or branched,

—$(CH_2)_mNR_xR_y$ wherein m is 0 or 1, and each of $R_x$ and $R_y$ is hydrogen or a straight chain alkyl group having 1 to 4 carbon atoms; and

$R_6$ is heteroaryl selected from a 5- or 6-membered monocyclic or fused bicyclic heterocyclic group containing at least 1 to 4 heteroatoms in at least one ring, said heteroatoms being nitrogen, oxygen, or sulfur and combinations thereof, said heterocyclic group being unsubstituted or substituted with amino, halo, nitro, hydroxy, cyano, trifluoromethyl, or an alkyl group having from 1 to 20 carbon atoms and the N-oxides thereof.

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**5,491,171**

## PHARMACEUTICAL PREPARATION CONTAINING PROSTAGLANDIN COMPOUND FOR RECTAL OR VAGINAL ADMINISTRATION

**Ken-ichi Nishimura, Kyoto; Akihisa Yoshimi, Osaka; Takayoshi Mori, Kyoto; Nobuharu Kakeya, Nagaokakyo; Masahiro Kikuchi, Osaka; Nobuo Kondoh, Osaka; Takeshi Uchida, Osaka, and Koichi Yamanouchi, Osaka, all of, Japan, assignors to Kyoto Pharmaceutical Industries, Ltd., Kyoto, and The Green Cross Corporation, Osaka, both of, Japan**

**PCT No. PCT/JP92/01431, § 371 Date Jul. 27, 1994, § 102(e) Date Jul. 27, 1994, PCT Pub. No. WO93/08804, PCT Pub. Date May 13, 1993**

**PCT Filed Nov. 5, 1992, Ser. No. 232,255**

**Claims priority, application Japan, Nov. 8, 1991, 3-321254**

**Int. Cl.[6] A61K** *31/20;31/19;31/557*

**U.S. Cl. 514—558** **5 Claims**

1. A pharmaceutical preparation for rectal or vaginal administration, comprising a pharmaceutically useful amount of a prostaglandin compound and an alkali metal salt of capric acid, said compound and salt being dispersed in an oily base.

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**5,491,172**

## N-ACYL SULFAMIC ACID ESTERS (OR THIOESTERS), N-ACYL SULFONAMIDES, AND N-SULFONYL CARBAMIC ACID ESTERS (OR THIOESTERS) AS HYPERCHOLESTEROLEMIC AGENTS

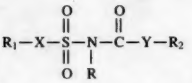
**Helen T. Lee, Ann Arbor; Joseph A. Picard; Drago R. Sliskovic, both of Ypsilanti, and Wendell Wierenga, Ann Arbor, all of Mich., assignors to Warner-Lambert Company, Morris Plains, N.J.**

**Continuation-in-part of Ser. No. 62,515, May 14, 1993, abandoned. This application Apr. 13, 1994, Ser. No. 223,932**

**Int. Cl.[6] A61K** *31/18;* **C07C** *307/02*

**U.S. Cl. 514—602** **17 Claims**

1. A compound of the formula



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or a pharmaceutically acceptable salt thereof wherein:

X is oxygen;

Y is $(CR'R")_n$ wherein n is an integer of from 1 to 4 and R' and R" are each independently hydrogen, alkyl, alkoxy, halogen, hydroxy, acyloxy, cycloalkyl, phenyl optionally substituted or R' and R" together form a spirocycloalkyl or a carbonyl;

R is hydrogen, a straight or branched alkyl of from 1 to 8 carbon atoms or benzyl;

$R_1$ and $R_2$ are each independently selected from

(a) phenyl or phenoxy each of which is unsubstituted or is substituted with 1 to 5 substituents selected from

phenyl,

an alkyl group having from 1 to 6 carbon atoms and which is straight or branched,

an alkoxy group having from 1 to 6 carbon atoms and which is straight or branched;

phenoxy,

hydroxy,

fluorine,

chlorine,

bromine,

nitro,

trifluoromethyl,

—COOH,

—COOalkyl wherein alkyl has from 1 to 4 carbon atoms and is straight or branched,

$—(CH_2)_pNR_3R_4$ wherein p is zero or one, and each of $R_3$ and $R_4$ is selected from hydrogen or a straight or branched alkyl group having 1 to 4 carbon atoms;

(b) 1- or 2-naphthyl unsubstituted or substituted with from 1 to 3 substituents selected from

phenyl,

an alkyl group having from 1 to 6 carbon atoms and which is straight or branched,

an alkoxy group having from 1 to 6 carbon atoms and which is straight or branched;

hydroxy,

phenoxy,

fluorine,

chlorine,

bromine,

nitro,

trifluoromethyl,

—COOH,

—COOalkyl wherein alkyl has from 1 to 4 carbon atoms and is straight or branched,

$—(CH_2)_pNR_3R_4$ wherein p, $R_3$ and $R_4$ have the meanings defined above;

(c) arylalkyl;

(d) a straight or branched alkyl chain having from 1 to 20 carbon atoms and which is saturated or contains from 1 to 3 double bonds; or

(e) adamantyl or a cycloalkyl group wherein the cycloalkyl moiety has from 3 to 6 carbon atoms.

**5,491,173**

## TRI-PHENYL ALKENE DERIVATIVES AND THEIR PREPARATION AND USE

**Reijo J. Toivola; Arto J. Karjalainen; Kauko O. A. Kurkela; Marja-Liisa Soderwall, all of Oulu; Lauri V. M. Kangas, Turku; Guillermo L. Blanco, Oulu; Hannu K. Sundquist, Kaarina, and Arja Kalapudas, Oulu, all of, Finland, assignors to Orion-yhtymä Oy, Turku, Finland**

**Continuation-in-part of Ser. No. 837,612, Feb. 21, 1992, abandoned, which is a continuation of Ser. No. 608,589, Oct. 31, 1990, abandoned, which is a continuation of Ser. No. 90,724, Aug. 28, 1987, abandoned, which is a continuation-in-part of Ser. No. 823,856, Jan. 29, 1986, Pat. No. 4,696,949, which is a division of Ser. No. 497,813, May 25, 1983, abandoned. This application Jan. 24, 1994, Ser. No. 188,420**

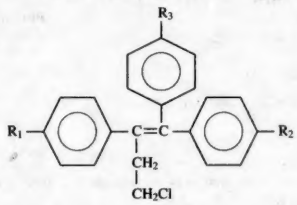
**Claims priority, application United Kingdom, Jun. 25, 1982, 8218414**

**The portion of the term of this patent subsequent to Sep. 29, 2004, has been disclaimed.**

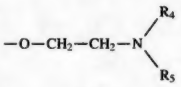
**Int. Cl.[6] A61K** *31/135;* **C07C** *217/26;217/48*

**U.S. Cl. 514—648** **12 Claims**

1. A compound of the formula:



wherein $R_1$ and $R_2$, which can be the same or different are H or OH, $R_3$ is



wherein $R_4$ and $R_5$, which can be the same or different are H or an alkyl group of 1 to 4 carbon atoms; provided that when $R_1$ and $R_2$ are both hydrogen, then $R_3$ is not dimethylaminoethoxy; and their non-toxic pharmaceutically acceptable salts or N-oxides and mixtures thereof.

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**5,491,174**

## PROCESS FOR PREPARATION OF POLYURETHANES UTILIZING NOVEL CATALYSTS

**Laura A. Grier, Brazoria; Paul L. Neill; Ralph D. Priester, both of Lake Jackson, all of Tex.; Larry W. Mobley, Cohutta, Ga.; Kenneth W. Skaggs, and Robert B. Turner, both of Lake Jackson, Tex., assignors to The Dow Chemical Company, Midland, Mich.**

**Continuation of Ser. No. 959,306, Oct. 9, 1992, abandoned. This application Apr. 7, 1995, Ser. No. 418,918**

**Int. Cl.[6] C08G** *18/24;* **C08J** *9/04;* **B05D** *7/26*

**U.S. Cl. 521—126** **7 Claims**

1. A method of preparing a polyurethane, polyurea, polycarbodiimide or polyisocyanurate polymer from a formulation including a delayed action catalyst comprising contacting as formulation components an active hydrogen-containing compound and a diisocyanate or polyisocyanate in the presence of a delayed action catalyst which is a tin(IV) salt complexed with a primary or secondary amine compound, under reaction conditions sufficient to form a polyurethane, polyurea, polycarbodiimide, or polyisocyanurate polymer.

5,491,175

## POLYURETHANE FOAM MOLDING

Yoshiaki Miyazaki, Minamitsuru, and Kazuo Mizumura, Kawasaki, both of, Japan, assignors to The Dow Chemical Company, Midland, Mich., and Dow Mitsubishi Kasei Ltd., Tokyo, Japan

Filed Mar. 25, 1993, Ser. No. 36,747

Claims priority, application Japan, Apr. 10, 1992, 4-116645; Apr. 10, 1992, 4-116654

Int. Cl.[6] C08G *18/10*

U.S. Cl. 521—137 10 Claims

1. Polyurethane foam moldings prepared by reacting a polyisocyanate with a polyol in the presence of water as a blowing agent, wherein (a) the polyisocyanate comprises a mixture of (i) from 5–30 weight percent polymethylene polyphenyl polyisocyanate and (ii) an NCO-terminated prepolymer having an NCO content of from 14–28 weight percent prepared from the reaction of an organic polyisocyanate with 20 to 45 weight percent of a poly(oxytetramethylene)glycol which is a linear polyetherpolyol having a primary hydroxy group in both its terminals and a weight average molecular weight of from 300–3000, said weight percents being based on the total weight of organic polyisocyanate, poly(oxytetramethylene)glycol, and polymethylene polyphenyl polyisocyanate, and (b) the polyol contains at least 30 weight percent polymer polyol prepared from the reaction of a polyetherpolyol with an ethylenically unsaturated monomer.

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5,491,176

## PROCESS FOR PREPARING FLEXIBLE FOAMS

Eric Huygens, Heverlee, Belgium, assignor to Imperial Chemical Industries PLC, London, England

Filed Jun. 5, 1995, Ser. No. 462,093

Claims priority, application United Kingdom, Jun. 16, 1994, 9412105; European Pat. Off., Jan. 30, 1994, 94203786

Int. Cl.[6] C08G *18/10*

U.S. Cl. 521—159 6 Claims

1. A process for preparing a flexible foam by reacting

1) at least two organic polyisocyanates with

2) an isocyanate-reactive compound containing at least two isocyanate-reactive hydrogen atoms and having a number average molecular weight of 1000 to 12000; and optionally with

3) an isocyanate-reactive compound containing at least two isocyanate-reactive hydrogen atoms and having a number average molecular weight of 60 to 999; and with

4) water; optionally in the presence of

5) a catalyst and

6) other auxiliaries and additives known per se, wherein

a) one organic polyisocyanate (a1) is an isocyanate-terminated prepolymer having an NCO value of 5–18% by weight, prepared by reacting an excessive amount of a diphenylmethane diisocyanate with an isocyanate-reactive compound containing at least two isocyanate-reactive hydrogen atoms and having a number average molecular weight of 1000 to 12000; and wherein another organic polyisocyanate (a2) is a polyisocyanate having an NCO value of at least 25% by weight;

b) 20–95 parts by weight of isocyanate-reactive compound 2) is used per 100 parts by weight of organic polyisocyanates 1); and

c) the reaction is conducted at an index of 40–130 with the proviso that the weight ratio of (a1):(a2)=5:1 to 1:1, the weight ratio of organic polyisocyanate 1):2)+3)+4)=4.7:1 to 1:1 and the weight ratio of 2)+3):4)=20:1 to 2:1.

5,491,177

## PROCESS FOR PREPARING A FLEXIBLE POLYURETHANE FOAM

Mireille B. A. De Witte, Gent, Belgium, assignor to Imperial Chemical Industries PLC, London, England

Filed Jun. 5, 1995, Ser. No. 464,195

Claims priority, application United Kingdom, Jun. 16, 1994, 9412105; European Pat. Off., Dec. 30, 1994, 94203786

Int. Cl.[6] C08G *18/10*

U.S. Cl. 521—159 10 Claims

1. A process for preparing a flexible polyurethane foam by reacting

1) an organic polyisocyanate with

2) a polyol having an average nominal hydroxyl functionality of 2–3 and a number average molecular weight of 1000 to 12000; and optionally with

3) an isocyanate-reactive compound containing at least two isocyanate-reactive hydrogen atoms and having a number average molecular weight of 60 to 999; using

4) a blowing agent; and optionally

5) a catalyst; and optionally

6) other auxiliaries and additives known per se characterised in that

a) the polyisocyanate is a polyisocyanate composition having an NCO value of 11–22% by weight which is a blend of

a1. 75–95 parts by weight of an isocyanate-terminated semi-prepolymer having an NCO value of 9–20% by weight, prepared by reacting an excessive amount of a polyisocyanate composition, consisting of 35–75% by weight of diphenylmethane diisocyanate and 25– 65% by weight of polymethylene polyphenylene polyisocyanate, with a polyol having an average nominal hydroxyl functionality of 2–3 and a number average molecular weight of 1000 to 12000; and

a2. 5–25 parts by weight of a polymethylene polyphenylene polyisocyanate;

b) 25–120 parts by weight of polyol 2) is used per 100 parts by weight of organic polyisocyanate;

c) water is used as blowing agent in an amount of 3–15 parts by weight per 100 parts by weight of polyol 2); and

d) the reaction is conducted at an index of 40–130.

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5,491,178

## HYDROGEN STABILIZERS FOR VINYL ETHER-BASED COATING SYSTEMS

Raymond J. Swedo, Mt. Prospect; George D. Green, Cary, and James R. Snyder, Chicago, all of Ill., assignors to AlliedSignal Inc., Morris Township, Morris County, N.J.

Continuation-in-part of Ser. No. 274,671, Jul. 13, 1994. This application Aug. 19, 1994, Ser. No. 293,613

Int. Cl.[6] C08K *5/134;5/36;5/098;* C08L *67/00*

U.S. Cl. 522—74 6 Claims

1. A method of reducing hydrogen generation from polymers produced by radiation of coating compounds comprising polymerizable oligomers and monomers having reactive functionalities selected from the group consisting of epoxy, acrylate, vinyl ether, maleate, or mixtures thereof, at least one of which contains a vinyl ether functionality, comprising adding to said coating compounds before radiation curing an effective amount of a mixture of

(a) hindered phenols selected from the group consisting of octadecyl 3-(3',5'-di-tert-butyl-4 -hydroxyphenyl)-propionate, tetrakis{methylene(3,5-di-tert-butyl-4-hydroxyhydrocinnamate)}methane, and benzene propanoic acid, 3,5-bis(1,1-dimethylethyl)-4 -hydroxy-, thio-2,1-ethane decyl ester;

(b) organic sulfides or organic disulfides selected from the group consisting of dodecyl sulfide, octyl sulfide, octadecyl sulfide, sec-octyl sulfide, t-butyl sulfide, dilaurylthiodipropionate, dodecyl disulfide, octyl disulfide, octadecyl disulfide, sec-octyl disulfide, t-butyl disulfide, phenyl sulfide, benzyl sul-

fide, tolyl sulfide, 6-hydroxy naphthyl sulfide, phenyl disulfide, benzyl disulfide, tolyl disulfide, and 6-hydroxy naphthyl disulfide; and

(c) transition metal salts or complexes of organic compounds selected from the group consisting of naphthenates, octoates, 2-ethyl hexanoates, cyclohexane butyrates, acetyl acetonates, and arene complexes, wherein said transition metals consist of one or more members of the group consisting of cobalt, manganese, nickel, copper, and zinc.

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**5,491,179**

## THERMALLY STABLE, GAMMA RADIATION-RESISTANT BLEND OF POLYCARBONATE WITH POLYESTER

**James P. Mason, McKees Rocks, Pa., assignor to Bayer Corporation, Pittsburgh, Pa.**

**Filed Nov. 23, 1994, Ser. No. 344,449**

**Int. Cl.[6] C08K** *5/524;5/529;* **C08L** *69/00;67/02*

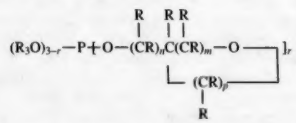
**U.S. Cl. 523—136** **10 Claims**

**1**. A thermoplastic molding composition comprising

(i) about 1 to 99 percent by weight of a polycarbonate resin, and

(ii) about 1 to 99 percent by weight of a polyester copolymer of phthalic acid and a mixture of cyclohexanedimethanol and ethylene glycol and

(iii) an effective positive amount of a phosphite compound conforming to



where n denotes 1 to 10, m is 1 to 10, p is 0 to 10 and r is 1 to 3, and where R is hydrogen or an alkyl or an aryl group having 1 to 10 carbon atoms and $R_3$ denotes an aryl or an alkyl group having 1 to 10 carbon atoms, said effective amount being sufficient to improve the resistance of the composition to degradation caused by exposure to gamma radiation as reflected in change in yellowness index, said cyclohexane dimethanol and said ethylene glycol being present in said polyester copolymer in a molar ratio of 1:1 to 4:1 therebetween, said percent in both occurrances being relative to the total weight of said (i) and (ii).

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**5,491,180**

## BINDER COMPOSITION FOR MOLD MAKING, BINDER/CURING AGENT COMPOSITION FOR MOLD MAKING, SAND COMPOSITION FOR MOLD MAKING, AND PROCESS OF MAKING MOLD

**Kazuhiko Kiuchi; Shigeo Nakai; Masuo Sawa; Masayuki Kato, all of Aichi; Mitsuru Sakai, Wakayama, and Shinya Nomura, Aichi, all of, Japan, assignors to Kao Corporation, Tokyo, Japan**

**Filed Aug. 17, 1994, Ser. No. 291,065**

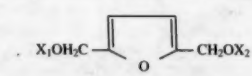
**Int. Cl.[6] B22C** *1/22*

**U.S. Cl. 523—139** **12 Claims**

**1**. A sand composition for mold making which comprises a granular refractory material; a binder composition which comprises:

(a) a binder comprising an acid-curable resin and

(b) from 0.5 to 63.0% by weight, based on the binder composition, of at least one curing accelerator selected from compounds represented by formula (1):



(1)

wherein $X_1$, $X_2$ each independently represent a hydrogen atom, a methyl group or an ethyl group,

wherein said acid-curable resin is a furfuryl alcohol/aldehyde polycondesate, and wherein said binder composition has a water content of from 0.5 to 30% by weight, based on the weight of the binder composition; and a curing agent for curing the binder composition, wherein said curing agent is a phosphorus-containing compound, a mixture of a phosphorus-containing compound and a sulfonic acid compound, a mixture of a phosphorus-containing compound and sulfuric acid, or a mixture of a phosphorus-containing compound, a sulfonic acid compound, and sulfuric acid.

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**5,491,181**

## THEMOPLASTIC MOLDING COMPOUNDS

**John Huggins, Leverkusen, Germany, assignor to Bayer Aktiengesellschaft, Leverkusen, Germany**

**Filed Jul. 22, 1994, Ser. No. 279,323**

**Claims priority, application Germany, Jul. 29, 1993, 43 25 483.7**

**Int. Cl.[6] C08K** *9/00*

**U.S. Cl. 523—200** **9 Claims**

**1**. In a themoplastic molding compound containing at least one coated ceramic powder and at least one thermoplastic binder, the improvement wherein the ceramic powder is coated with at least one dispersant comprising a monovalent cation salt of an acid selected from the group consisting of a phosphoric acid ester, a phosphonocarboxylic acid ester and a phosphonic acid.

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**5,491,182**

## GLASS FIBER SIZING COMPOSITIONS AND METHODS OF USING SAME

**Charles R. Key, Simpsonville, S.C., and Yen-Jer Shih, Belle Mead, N.J., assignors to National Starch and Chemical Investment Holding Corporation, Wilimgton, Del.**

**Filed Jul. 27, 1994, Ser. No. 280,912**

**Int. Cl.[6] C08K** *9/04*

**U.S. Cl. 523—206** **13 Claims**

**1**. A sizing composition for use on glass fibers which are used to prepare fiber-reinforced plastics which contain a plastic resin, the sizing composition comprising: a polymer prepared from at least one monomer(s) selected from the group consisting of acrylic acid, methacrylic acid, $C_1$–$C_{18}$ alkyl esters of acrylic acid, $C_1$–$C_{18}$ alkyl esters of methacrylic acid, glycidyl acrylate, glycidyl methacrylate, $C_1$–$C_4$ hydroxyalkyl esters of acrylic acid, $C_1$–$C_4$ hydroxyalkyl esters of methacrylic acid, vinyl esters of saturated aliphatic monocarboxylic acids containing up to 10 carbon atoms, (meth)acrylamide and their N-substituted derivatives, vinyl ethers, N-vinyl lactams, halogenated vinyl compounds, alkyl vinyl ketones, (meth-)allyl ester of saturated aliphatic monocarboxylic acids, vinyl pyrrole, olefins, diesters of itaconic, maleic and/or fumaric acid, and styrene, the polymer having a weight average molecular weight of not more than 55,000, as determined by gel permeation chromotography, to provide improved wettability of the glass fibers by the plastic resin and improved clarity of the fiber-reinforced plastics prepared from the sized glass fibers and the plastic resin compared to size compositions which utilize a polymer having a weight average molecular weight of greater than 55,000; and an ingredient selected from the group consisting of a silane coupling agent, a lubricant suitable for use in the sizing composition and acetic acid.

5,491,183

## CATHODIC ELECTRODEPOSITION PAINT FORMING FILMS HAVING IMPROVED SURFACE SMOOTHNESS

**Mitsuo Yamada, Suita; Ichiro Kawakami; Hiroyuki Nojiri, both of Takatsuki, and Toshiyuki Ishii, Neyagawa, all of, Japan, assignors to Nippon Paint Co., Ltd., Osaka, Japan**

**Filed Nov. 4, 1994, Ser. No. 336,117**

**Claims priority, application Japan, Nov. 5, 1993, 5-301124; Nov. 5, 1993, 5-301125**

**Int. Cl.[6] C08K** *3/20;* **C08L** *63/02;63/04*

**U.S. Cl. 523—404** **22 Claims**

1. In a cathodic electrodeposition paint composition comprising a primary cationically modified epoxy resin and a crosslinker dispersed in an aqueous medium containing a neutralizing acid, the improvement wherein Said epoxy resin is a bisphenol epoxy resin and wherein said paint comprises a cured film surface smoothness improving amount, from 0.5 to 30% of the combined weight of said primary resin and said cross-linker, of an auxiliary resin which is a reaction product produced either by reacting a t-alkylphenol novolac epoxy resin with an amount of a cationic active hydrogen compound or a non-cationic active compound sufficient to open all of the epoxy rings of said epoxy resin, or by first reacting said epoxy resin with an amount of said non-cationic active compound sufficient to open only a portion of said epoxy rings and then with an amount of said cationic active hydrogen compound sufficient to open the remaining epoxy rings.

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5,491,184

## UNSATURATED POLYESTER-MODIFIED FLEXIBLE COPOLYMERS FOR USE IN SHEET MOLDING COMPOSITIONS

**Douglas S. McBain, Norton; Earl G. Melby, Uniontown, and Kevin P. LaJudice, Akron, all of Ohio, assignors to GenCorp. Inc., Fairlawn, Ohio**

**Continuation of Ser. No. 1,489, Jan. 7, 1993, Pat. No. 5,385,963, which is a continuation-in-part of Ser. No. 828,080, Jan. 30, 1992, Pat. No. 5,362,819. This application Oct. 26, 1994, Ser. No. 329,358**

**The portion of the term of this patent subsequent to Jan. 31, 2095, has been disclaimed.**

**Int. Cl.[6] C08L** *67/06;63/10*

**U.S. Cl. 523—436** **20 Claims**

1. A process for using an ABA block copolymer for making a toughened unsaturated polyester composition comprising: mixing an ABA block copolymer into an unsaturated polyester resin composition wherein the A block has molecular weight from about 100 to 600 and is a polyester consisting essentially of a condensation product of one or more saturated alkylene oxides or alkyl diols having up to 18 carbon atoms and one or more dicarboxylic acids or their anhydrides having 1 to 10 carbon atoms, wherein at least 50 mole percent of said dicarboxylic acids or their anhydrides have unsaturation, and the B block is a polyester free of internal unsaturation reactive in crosslinking reactions of unsaturated polyesters having a Tg of 0° C. or less.

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5,491,185

## EPOXY SELF-PRIMING TOPCOATS

**Charles R. Hegedus, Coopersburg, Pa.; Donald J. Hirst, Mt. Laurel, and Anthony T. Eng, Cherry Hill, both of N.J., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Continuation-in-part of Ser. No. 62,864, May 14, 1993, Pat. No. 5,308,903. This application Mar. 7, 1994, Ser. No. 207,448**

**The portion of the term of this patent subsequent to Apr. 13, 2010, has been disclaimed.**

**Int. Cl.[5] C08L** *63/00*

**U.S. Cl. 523—451** **10 Claims**

1. A corrosion-resistant self-priming coating comprising from about 15 to 50 parts by weight of an epoxy resin binder, 1 to 30 parts by weight of an alkaline earth metal phosphate, 0.1 to 5 parts by weight of a zinc benzoate, 1 to 25 parts weight of an aluminum triphosphate, 1 to 30 parts by weight of titanium dioxide, 0 to 2.0 parts by weight of an oil soluble surface active agent and 0 to 50 parts by weight of at least one organic solvent.

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5,491,186

## BONDED INSULATING BATT

**James H. Kean, 2310 Linden Ave., Boulder, Colo. 80304, and Tod M. Kean, 390 E. Ray Rd., Chandler, Ariz. 85224**

**Filed Jan. 18, 1995, Ser. No. 374,457**

**Int. Cl.[6] C08L** *1/00;* **E04B** *1/74;* **B32B** *5/06;3/26*

**U.S. Cl. 524—13** **11 Claims**

1. A thermal insulating batt comprising a thermally bonded fiber structure consisting essentially of:

a) secondary cellulose fiber having a density of up to about 1.5 lbs/cubic foot;

b) about from 2.5 to 12 percent by weight of thermoplastic binder fiber having a melting point below the decomposition temperature of the secondary fiber; and

c) up to about 25 percent by weight of lofting fiber different from the binder fiber;

wherein the insulating batt has a density of up to about 2.5 lbs/cubic foot and the insulating batt recovers at least about 80 percent of its precompression volume upon decompression.

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5,491,187

## PLASTIC COMPOSITIONS WITH ANTISTATIC PROPERTIES

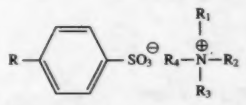
**James J. Ward, Collierville, and William P. Chatham, Memphis, both of Tenn., assignors to Witco Corporation, Greenwich, Conn.**

**Division of Ser. No. 279,810, Jul. 25, 1994. This application Jun. 6, 1995, Ser. No. 471,080**

**Int. Cl.[6] C08K** *5/17;5/42*

**U.S. Cl. 524—159** **8 Claims**

1. An article comprising an acrylic resin and at least one substituted ammonium salt of a long-chain alkylbenzene sulfonic acid and of a fatty acid, the salt having the formula:



wherein R is a straight or branched chain alkyl group having from 10 to 14 carbon atoms, $R_1$ is hydroxyethyl or an alkyl group having from one to six carbon atoms, $R_2$ and $R_3$ are the same or different and are hydroxyethyl, an alkyl group having from one to six carbon atoms, or hydrogen, and $R_4$ is hydrogen or an alkyl group having from one to six carbon atoms and the fatty acid having from 16 to 24 carbon atoms, the amount of the ammonium salt and of the fatty acid being effective to reduce the tendency of the resin to acquire a static electric charge.

5,491,188

## POROUS STRETCHED ARTICLE OF POLYPROPYLENE-BASED RESIN AND PROCESS FOR ITS PREPARATION

**Naoki Ikeda, Soraku; Masafumi Yoshimura, Kuze; Kazuaki Mizoguchi, Uji, and Yoshiharu Kimura, Omihachiman, all of, Japan, assignors to New Japan Chemical Co., Ltd., Kyoto, Japan**

**Filed May 17, 1994, Ser. No. 245,040**

**Claims priority, application Japan, May 20, 1993, 5-143037**

**Int. Cl.[6] C08K** *5/20*

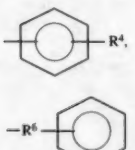
**U.S. Cl. 524—229** **19 Claims**

1. A process for producing a porous stretched article of polypropylene-based resin, the process comprising the steps of crystallizing a melt of a polypropylene-based resin composition, wherein the polypropylene-based resin is selected from the group consisting of polylene homopolymers, random and block copolymers of propylene as a predominant comonomer and at least one comonomer selected from the group consisting of ethylene and at least one 1-alkene, propylene-ethylene copolymers which further contain other comonomer(s) selected from the group consisting of 5-ethylidene-2-nornornene, 5-methylene-2-norbornene and 1,4-hexadiene, propylene-styrene copolymers, and a blend of polypropylene and a small quantity of a thermoplastic resin selected from the group consisting of high-density polyethylene, polybutene-1 and poly-4-methylpentene-1, and wherein the polypropylene-based resin has a melt flow rate of about 0.1 to 100 g/10 min, at a temperature of 15° to 140° C. to form a solidified product containing β-form crystals and stretching the resulting solidified product at a temperature which is higher than 20° C. but lower than the melting point of the β-form crystals in said solidified product, the polypropylene-based resin composition consisting essentially of the polypropylene-based resin and 0.0001 to 5 parts by weight, per 100 parts by weight of the polypropylene-based resin, of at least one amide compound selected from the group consisting of:

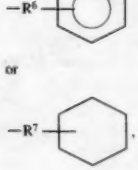
(1) an amide compound of the formula

$$R^2—NHCO—R^1—CONH—R^3 \quad (1)$$

wherein $R^1$ is a residue formed by elimination of the two carboxyl groups of a $C_{3-26}$ saturated or unsaturated aliphatic dicarboxylic acid, a $C_{6-30}$ saturated or unsaturated alicyclic dicarboxylic acid or a $C_{8-30}$ aromatic dicarboxylic acid; $R^2$ and $R^3$ are the same or different and each represents a $C_{3-18}$ cycloalkyl group, a $C_{3-12}$ cycloalkenyl group, or a group of the formula



or

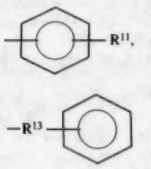


wherein $R^4$ is a hydrogen atom, a $C_{1-12}$ straight- or branched-chain alkyl group, a $C_{2-12}$ straight- or branched-chain alkenyl group, a $C_{6-10}$ cycloalkyl group or a phenyl group; $R^5$ is a $C_{1-12}$ straight- or branched-chain alkyl group or a $C_{2-12}$ straight- or branched-chain alkenyl group; and $R^6$ and $R^7$ each represents a $C_{1-4}$ straight- or branched-chain alkylene group;

(2) an amide compound of the formula

$$R^9—CONH—R^8—NHCO—R^{10} \quad (2)$$

wherein $R^8$ is a residue formed by elimination of the two amino groups of a $C_{1-24}$ saturated or unsaturated aliphatic diamine, a $C_{4-28}$ alicyclic diamine, a $C_{4-14}$ heterocyclic diamine or a $C_{6-28}$ aromatic diamine; $R^9$ and $R^{10}$ are the same or different and each represents a $C_{3-12}$ cycloalkyl group, a $C_{3-12}$ cycloalkenyl group, or a group of the formula



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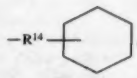

wherein $R^{11}$ is a hydrogen atom, a $C_{1-12}$ straight- or branched-chain alkyl group, a $C_{2-12}$ straight- or branched-chain alkenyl group, a $C_{6-10}$ cycloalkyl group or a phenyl group; $R^{12}$ is a $C_{1-12}$ straight- or branched-chain alkyl group, a $C_{2-12}$ alkenyl group, a $C_{6-10}$ cycloalkyl group or a phenyl group; and $R^{13}$ and $R^{14}$ each represents a $C_{1-4}$ straight- or branched-chain alkylene group; and

(3) an amide compound of the formula

$$R^{16}—CONH—R^{15}—CONH—R^{17} \quad (3)$$

wherein $R^{15}$ is a residue formed by elimination of one amino group and one carboxyl group from of a $C_{2-29}$ saturated or unsaturated aliphatic amino acid, $C_{7-13}$ saturated or unsaturated alicyclic amino acid or $C_{7-15}$ aromatic amino acid; $R^{16}$ and $R^{17}$ are the same or different and $R^{16}$ has the same meaning as $R^9$ or $R^{10}$ in the formula (2) and $R^{17}$ has the same meaning as $R^2$ or $R^3$ in the formula (1).

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5,491,189

## AQUEOUS VULCANIZING ADHESIVE

**Hans Scheer; Wolf-Dieter Beiersdorf, both of Dusseldorf, and Hans-Joachim Purps, Langenfeld, all of, Germany, assignors to Henkel Kommanditgesellschaft auf Aktien, Duesseldorf, Germany**

**Continuation of Ser. No. 775,949, Dec. 20, 1991, abandoned. This application Jan. 26, 1994, Ser. No. 187,667**

**Claims priority, application Germany, Apr. 26, 1989, 39 13 691.4**

**Int. Cl.[6] C09J** *119/02*

**U.S. Cl. 524—259** **21 Claims**

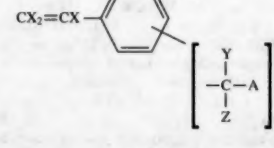
1. A water-based binder dispersion for vulcanizing rubber onto vulcanization-stable substrates, said dispersion consisting essentially of water and:

(A) a halogen-containing copolymer consisting of polymerized units of:

60 to 97% by weight of at least one 2,3-dihalo-1,3-butadiene;

2 to 33% by weight of at least one aromatic monoalkenyl alkyl halide corresponding to the formula:

I.



or

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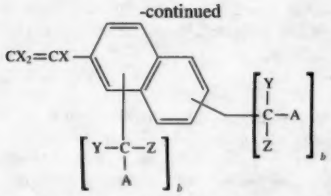
II.



in which X is selected from the group consisting of hydrogen, chlorine, bromine and iodine; Y is selected from the group consisting of hydrogen, chlorine and bromine; Z is selected from the group consisting of hydrogen, chlorine and bromine and A is selected from the group consisting of hydrogen, chlorine, bromine and a $C_{1-3}$ alkyl group, with the proviso that, of Y, Z and A, at least one is chlorine or bromine and, where A is an alkyl group, at least one of Y and Z is chlorine or a bromine, and a=1 or 2 and b=0, 1 or 2, with the proviso that at least one b is at least 1; and

0.5 to 10% by weight of at least one olefinically unsaturated monomer which is at least copolymerizable with the conjugated diene monomer and different from the aromatic monoalkenyl alkyl halide,

(B) an aromatic polynitroso compound containing at least two nitroso groups attached directly to non-adjacent ring carbon atoms,

(C) one or more auxiliaries selected from the group consisting of pigments, carbon black, foam inhibitors, and emulsifiers, and

(D) a partly saponified copolymer of vinyl acetate that contains polymerized units of one or more comonomers selected from the group consisting of olefins, halogenated olefins, vinyl ethers, olefinically unsaturated carboxylic acids, esters of olefinically unsaturated carboxylic acids, olefinically unsaturated dicarboxylic acids, and esters of olefinically unsaturated dicarboxylic acids, said water-based binder dispersion being free from masked polyisocyanates.

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**5,491,190**

## REPULPABLE HOT MELT POLYMER/FATTY ACID COMPOSITIONS FOR FIBROUS PRODUCTS

**Paul E. Sandvick, and Calvin J. Verbrugge, both of Racine County, Wis., assignors to S. C. Johnson & Son, Inc., Racine, Wis.**

**Filed Jul. 22, 1993, Ser. No. 96,523**

**Int. Cl.[6] C08J** *3/20;* **C08K** *5/09;* **C08L** *33/00*

**U.S. Cl. 524—322** **12 Claims**

1. A hot melt polymer/fatty acid composition that is dispersible in a heated nearly neutral to alkaline aqueous pH medium consisting essentially of

A. from about 5% to 50% by weight based upon the total weight of the composition of at least one addition polymer selected from the group consisting of

(i) a polymer of from about 5 to 95 mole percent of at least one ethylenically unsaturated monocarboxylic acid monomer containing a free carboxyl group and from about 5 to 95 mole percent of at least one additional ethylenically unsaturated monomer,

(ii) a polymer of from about 50 to 95 mole percent of at least one ethylenically-unsaturated dicarboxylic acid monomer selected from the group consisting of an ethylene-1,2-dicarboxylic acid containing two free carboxyl groups and an ethylene 1,2-dicarboxylic acid anhydride having two carboxyl groups in the form of an anhydride group, and from about 5 to 50 mole percent of at least one additional ethylenically unsaturated monomer, and

(iii) a polymer of a total of from about 5 to 95 mole percent of (a) at least one of the ethylenically unsaturated monocarboxylic acid monomers and (b) at least one of the ethylenically-unsaturated dicarboxylic monomers and from about 5 to 95 mole percent of at least one additional ethylenically unsaturated monomer,

wherein the additional ethylenically unsaturated monomer is selected from the group consisting of 1-alkenes having from about 4 to 60 carbon atoms; alkyl vinyl ethers having an ether alkyl group of from about 8 to 60 carbon atoms, and alkyl acrylates or alkyl methacrylates having an alkyl group of from about 8 to 60 carbon atoms, and

B. from about 50% to 95% by weight based upon the total weight of the composition of at least one fatty acid selected from the group consisting of natural or synthetic fatty acids containing from about 12 to 48 carbon atoms, wherein the fatty acid is compatible with the polymer and wherein the composition is a solid at 20° C., but starts to become fluid between about 50° C. and 95° C.

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**5,491,191**

## STABLE CHLOROSULFONATED RESIN LATEX

**John C. Chen, Hockessin, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Continuation-in-part of Ser. No. 864,118, Apr. 6, 1992, abandoned. This application Apr. 7, 1992, Ser. No. 866,764**

**The portion of the term of this patent subsequent to Apr. 7, 2009, has been disclaimed.**

**Int. Cl.[6] C08L** *9/00*

**U.S. Cl. 524—576** **6 Claims**

1. A self-stabilized chlorosulfonated resin latex composition comprising an aqueous emulsion of a salt of a chlorosulfonated $C_2$–$C_8$ alpha-olefin homopolymer, said chlorosulfonated homopolymer having a chlorine content of 20–70 weight percent and a sulfur content of 1.5–10 weight percent with the proviso that the latex is substantially free of surfactants.

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**5,491,192**

## NON-AQUEOUS DISPERSION FOR ALKYD FORMULATION

**Frederick H. Walker, Hatfield; Chao-Jen Chung, Gwynedd, and Andrew Mercurio, Gwynedd Valley, all of Pa., assignors to Rohm and Haas Company, Philadelphia, Pa.**

**Continuation of Ser. No. 407,676, Sep. 11, 1989, abandoned, which is a division of Ser. No. 368,104, Jun. 19, 1989, abandoned, which is a continuation of Ser. No. 104,624, Oct. 2, 1987, abandoned. This application Aug. 28, 1991, Ser. No. 754,262**

**Int. Cl.[6] C08L** *67/08*

**U.S. Cl. 525—7.4** **5 Claims**

1. A method for reducing the drying time of a coating formed from an alkyd-containing formulation comprising:

admixing with said alkyd-containing formulation at least an effective amount of a non-aqueous, alkyd-free polymeric dispersion comprising from about 10 to about 60 weight percent of a first polymer, said first polymer, consisting essentially of an addition-polymerized polymer formed from at least one monoethylenically-unsaturated monomer, and from about 90 to about 40 weight percent of a second polymer, said second polymer consisting essentially of an addition-polymerized polymer formed from at least one monoethylenically-unsaturated monomer, where said first polymer is attached to or adsorbed onto said second polymer and where said first polymer is soluble in the non-aqueous medium, has a number average molecular weight in the range of from about 2000 to about 40,000, and has a calculated glass transition temperature greater than −10° C., and where said second polymer is insoluble in said non-aqueous medium.

5,491,193

## CROSSLINKED EPOXY FUNCTIONALIZED POLYDIENE BLOCK POLYMERS AND ADHESIVES

James R. Erickson, Katy, Tex., assignor to Shell Oil Company, Houston, Tex.

Division of Ser. No. 772,172, Oct. 7, 1991, Pat. No. 5,382,604. This application May 10, 1994, Ser. No. 241,710
Int. Cl.[6] C08F 297/02; C08C 19/06
U.S. Cl. 525—65 7 Claims

5. A process for the preparation of epoxidized chemically crosslinked diolefin block polymers comprising the steps of:

a) providing a polymer comprising monomer units of at least one conjugated diolefin;

b) epoxidizing the polymer; and

c) chemically crosslinking the epoxidized polymer to result in a crosslinked polymer which is crosslinked through at least some of the epoxy functionality.

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5,491,194

## THERMALLY PROCESSABLE BLENDS OF HIGH MODULUS POLYURETHANES AND MASS POLYMERIZED ABS RESINS

David E. Henton, Midland, Mich.; Augustin Chen, Cheshire, Conn.; Paul J. Moses, Midland, Mich.; Benjamin S. Ehrlich, League City, Tex., and Douglas E. Beyer, Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Continuation of Ser. No. 705,241, May 24, 1991, abandoned. This application Jun. 7, 1995, Ser. No. 484,367
Int. Cl.[6] C08L 55/02; 75/04
U.S. Cl. 525—66 8 Claims

1. A thermally processable, polyurethane composition comprising from about 35 to about 90 weight percent of a thermally processable, rigid polyurethane and from about 65 to 10 weight percent of a mass ABS either dispersed in or co-continuous with the polyurethane, said mass ABS resin being comprised of from about 5 to about 35 weight percent rubber and from about 95 to about 65 weight percent of a copolymer of acrylonitrile and styrene.

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5,491,195

## RUBBER MODIFIED POLYSTYRENE

David Schrader; Mark E. Soderquist, and Mark D. Heires, all of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Division of Ser. No. 116,163, Sep. 2, 1993, Pat. No. 5,428,106. This application Dec. 21, 1994, Ser. No. 360,868
Int. Cl.[6] C08L 51/04
U.S. Cl. 525—71 13 Claims

1. A method for the preparation of a rubber-modified monovinylidene aromatic polymer composition said composition comprising, on a total composition weight basis, from about 90 to about 55 weight percent of a rigid monovinylidene aromatic polymer matrix and from about 10 to about 45 weight percent of grafted and occluded 1,3-alkadiene-based rubber particles dispersed within said matrix wherein from about 25 to about 80 weight percent of said rubber particles have a capsule particle morphology and a volume average particle size of from 0.1 to 0.4 micron and from about 75 to about 20 weight percent of said particles have an entanglement particle morphology and a volume average particle size of from about 0.25 to about 1 micron, wherein said entanglement rubber particles contain, on an entanglement particle weight basis, less than 10 percent of particles having a particle diameter in excess of 1 micron; said composition having a total rubber content, stated on a 1,3-alkadiene weight basis, of from about 10 to about 25 weight percent and wherein the combined volume average particle size of the capsule morphology and entanglement morphology particles is less than 0.5 micron; said method comprising:

a. dissolving from about 5 to about 30 parts by weight of a 1,3-alkadiene/monovinylidene aromatic block copolymer rubber in from about 95 to about 70 parts by weight of a monovinylidene aromatic monomer, said block copolymer rubber being one which has from about 15 to about 40 weight percent of monovinylidene aromatic monomer copolymerized therein;

b. polymerizing the resulting rubber/monomer solution at a temperature of from about 50 to about 210° C., in the presence of from 0 to about 1000 parts per million by weight of a polymerization initiator and from 0 to about 2000 parts per million by weight of a chain transfer agent and under agitation conditions sufficient to provide capsule morphology and entanglement morphology rubber particles in the above-specified size ranges; and

c. thereafter recovering the resulting rubber-modified monovinylidene aromatic polymer product.

8. A rubber-modified monovinylidene aromatic polymer composition which comprises, on a total composition weight basis, from about 90 to about 55 weight percent of a rigid monovinylidene aromatic polymer matrix and, dispersed within said matrix, from about 10 to about 45 weight percent of grafted and occluded 1,3-alkadiene-based rubber particles, said particles being composed, on a total grafted/occluded rubber particle weight basis, of:

a. from 25 to about 80 weight percent of rubber particles having a capsule morphology and a volume average particle size of from 0.1 to 0.4 micron;

b. from about 75 to about 20 weight percent of rubber particles having an entanglement morphology and having a volume average particle size of from about 0.25 to 1 micron, wherein said entanglement rubber particles contain, on an entanglement particle weight basis, less than 10 percent of particles having a particle diameter in excess of 1 micron and the combined volume average particle size of the capsule morphology and entanglement particle morphology particles is less than 0.5 micron; and

c. from about 1 to about 25 weight percent of rubber particles having a cellular rubber particle morphology and having a volume average particle size of from about 0.6 to about 1.2 micron.

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5,491,196

## HALOBUTYL/SOLUTION POLYMERIZED SBR INNERLINER

Roger N. Beers, Uniontown; David A. Benko, Munroe Falls; Bill B. Gross, Stow, and Adel F. Halasa, Bath, all of Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Feb. 24, 1995, Ser. No. 393,788
Int. Cl.[6] C08L 9/06; 15/02; B60C 1/00
U.S. Cl. 525—237 12 Claims

1. A tire innerliner prepared from a composition comprising, based on 100 parts by weight of rubber, a blend of

(A) about 30 to about 50 parts by weight of a solution polymerized polymer having repeating units and a Tg ranging from −45° C. to −65° C., wherein

(1) 25 to 40 weight percent of the repeating units are derived from styrene;

(2) 5 to 30 weight percent of the repeating units have a 1,2-microstructure and are derived from butadiene; and

(3) 40 to 60 weight percent of the repeating units have a 1,4-microstructure and are derived from butadiene; and

(B) about 70 to about 50 parts by weight of a halobutyl rubber.

5,491,197

## HYDROGENATED BLOCK COPOLYMERS CONTAINING EPOXY GROUPS AND THEIR PREPARATION

Sergio Custro, Ravenna, and Gian I. Viola, Cervta Ravenna, both of, Italy, assignors to Enichem Elastomeri S.R.L., Milan, Italy

Division of Ser. No. 311,324, Sep. 23, 1994, abandoned, which is a division of Ser. No. 831,444, Feb. 5, 1992, Pat. No. 5,412,040. This application Mar. 31, 1995, Ser. No. 414,596
Claims priority, application Italy, Feb. 6, 1991, MI91A0306
Int. Cl.[6] C08F *8/08*
U.S. Cl. 525—332.8 30 Claims

1. A process for preparing a vinylaromatic-diene block copolymer, wherein said diene blocks have been partially hydrogenated and subsequently epoxidized according to formula (I):

$$(A—(E—B—EPOX))_nX \quad (I)$$

wherein A is a polyvinylaromatic block,

(E—B—EPOX) is an ethylene-butene copolymeric block containing 1,4 cis and 1,4 trans epoxy units distributed along the polymeric chain, n is an integer between 1 and 20 and X is a coupling radical having functionality n, said copolymers having a weight average molecular weight ranging from 30,000 to 400,000, a content of polyvinylaromatic blocks of between 10 and 50% by weight, a content of EPOX units of between 1% and 20% of the initial unsaturations present in the polymer before its partial hydrogenation, comprising the steps of:

(a) partially hydrogenating diene blocks of a vinylaromatic-diene block copolymer; and

(b) epoxidizing the partially hydrogenated vinylaromaticdiene block copolymer of step (a) to obtain a block copolymer according to formula (I).

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5,491,198

## PROCESS FOR PHOSPHONYLATING THE SURFACE OF AN ORGANIC POLYMERIC PREFORM

Shalaby W. Shalaby, Anderson, and M. Scott McCaig, Clemson, both of S.C., assignors to Clemson University, Clemson, S.C.

Continuation-in-part of Ser. No. 68,297, May 27, 1993, abandoned, which is a continuation of Ser. No. 840,020, Feb. 24, 1992, abandoned. This application Jan. 28, 1994, Ser. No. 188,478
Int. Cl.[6] C08F *8/40*
U.S. Cl. 525—340 14 Claims

1. A method for treating an organic polymer preform to produce a phosphonylated surface thereon, said method comprising the steps of:

exposing the surface of an organic polymer preform to a gas containing a phosphorus trihalide; and

feeding controlled amounts of oxygen for phosphonylation of the surface of said preform, so that phosphonylation substantially occurs at the surface of said preform and so that a selective amount of reactive carbon atoms contained within said preform are reacted with said phosphorus trihalide, said amount being greater than zero and less than about 30 percent of said carbon atoms.

5,491,199

## ONE STEP PRODUCTION OF LOW SALT VINYLAMINE POLYMERS

Michael E. Ford, Coopersburg, and John N. Armor, Orefield, both of Pa., assignors to Air Products and Chemicals, Inc., Allentown, Pa.

Filed Feb. 22, 1995, Ser. No. 392,431
The portion of the term of this patent subsequent to Jul. 25, 2012, has been disclaimed.
Int. Cl.[6] C08F *8/12*
U.S. Cl. 525—362 11 Claims

1. A process for the conversion of an N-vinylformamide containing polymer to the corresponding vinylamine polymer, said process comprising heating said N-vinylformamide containing polymer to a temperature of from about 50° to 225° C. in an aqueous medium in the presence of a catalyst comprising a transition metal selected from the group consisting of Group VIII metals, vanadium, chromium, manganese, copper, and zinc.

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5,491,200

## POLYCAPROLACTAM MOLECULAR COMPOSITES

Frank W. Harris, Akron, Ohio, and Hong Ding, Pittsburgh, Pa., assignors to Edison Polymer Innovation Corporation, Brecksville, Ohio

Filed Dec. 22, 1993, Ser. No. 171,523
Int. Cl.[6] C08G *69/00;69/48*
U.S. Cl. 525—419 17 Claims

1. A process for making a polyimide-nylon 6 copolymer that includes:

preparing a reaction mixture comprising combining

(a) a rigid-backbone polyimide to which is attached at least one caprolactam ring having an acyl group attached to the nitrogen atom contained in said ring, said acyl group activating said ring, with

(b) molten caprolactam and thereafter initiating polymerization of said molten caprolactam in said mixture, whereupon nylon 6 chains propagate from said rings to form a molecularly-reinforced copolymer.

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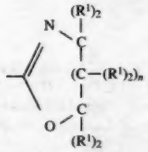
5,491,201

## MESOGENIC CYCLIC IMINO ETHER-CONTAINING COMPOSITIONS AND POLYMERIZATION PRODUCTS THEREOF

Robert E. Hefner, Jr., and Jimmy D. Earls, both of Lake Jackson, Tex., assignors to The Dow Chemical Company, Midland, Mich.

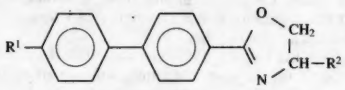
Continuation-in-part of Ser. No. 240,940, May 10, 1994, abandoned, which is a division of Ser. No. 119,852, Sep. 10, 1993, Pat. No. 5,338,828, which is a division of Ser. No. 832,070, Feb. 6, 1992, Pat. No. 5,281,675. This application Feb. 16, 1995, Ser. No. 389,461
Int. Cl.[6] C07D *263/10*
U.S. Cl. 525—420 3 Claims

1. A cyclic imino ether containing one or more rodlike mesogenic moieties and one or two terminal groups of the formula:



wherein $R^1$ is independently hydrogen or hydrocarbyl group having 1 to about 3 carbon atoms and n has a value of 0 or 1; said cyclic imino ether not including the following: 2-(4-(4-methoxy-4'-biphenyloxy)butyl)-2-oxazoline, 2-(6-(4-methoxy-4'-methoxy-

4'-biphenyloxy)butyl)-2-oxazoline, 2-(4-(4 -phenylphenoxy)butyl)-2-oxazoline, 2,2'-(1,1'-biphenyl)-4,4'-diylbis(4, 5 -dihydro)oxazole or compounds represented by the following formula:



wherein $R^1$ represents an alkoxy group having not more than 20 carbon atoms and $R^2$ represents an alkyl group having from 1 to 8 carbon atoms, or said not included compounds which are substituted at one or more sites on their aromatic rings by hydrocarbyl of 1 to 10 carbons, hydrocarbyloxy of 1 to 10 carbons, a phenyl group, halogen, nitro, nitrile or —COR, where R is hydrogen or hydrocarbyl of 1 to 3 carbon atoms.

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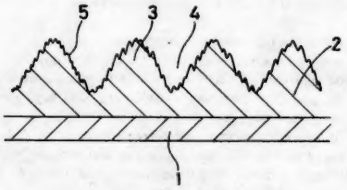
**5,491,202**

## LOW GLOSS POWDER COATING COMPOSITION AND METHOD FOR COATING THEREWITH

**Takafumi Umehara; Eiji Shimada, and Tadashi Sugimoto, all of Yokohama, Japan, assignors to NOF Corporation, Tokyo, Japan**

**Filed Sep. 7, 1994, Ser. No. 301,786**
**Int. Cl.[6] C08F *20/00***
**U.S. Cl. 525—438** **7 Claims**




1. A powder coating composition for forming a low gloss coating film based on thermosetting polyester resins, comprising three thermosetting polyester resins (A), (B) and (C) and a hardener (D), the weight ratio of the polyester resin (A) to the polyester resin (B) being in the range of 90/10–70/30 and that of the polyester resin (A) to the polyester resin (C) in the range of 85/15–60/40 and the equivalent ratio of the polyester resin (A, B or C) to the hardener (D) being each in the range of 0.8 to 1.25, wherein the polyester resins (A), (B) and (C) are selected from those in which the moduli of elasticity $E_a$, $E_b$ and $E_c$ for the products of the curing reactions of the resins (A), (B) and (C) with the ,hardener (D), respectively, after 3 minutes' curing with the hardener (D) at 200° C. hold a relationship that the differences between the moduli of elasticity $E_{b-a}=E_b-E_a$ and $E_{c-a}=E_c-E_a$ are maintained in the following ranges, respectively:

$20\ dyn/cm^2<E_{b-a}<10^3\ dyn/cm^2$ and

$1\ dyn/cm^2<E_{c-a}<10\ dyn/cm^2$

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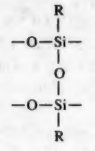
**5,491,203**

## POLYORGANOSILOXANE AND PROCESS FOR PRODUCING THE SAME

**Fumio Matsui; Nobuo Uotani; Masatoshi Murakami, and Yuji Itoh, all of Kanagawa, Japan, assignors to Showa Denko K. K., Tokyo, Japan**

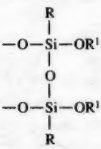
**Filed Sep. 8, 1994, Ser. No. 302,255**
**Int. Cl.[6] C08F *283/00***
**U.S. Cl. 525—474** **26 Claims**

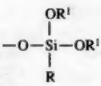
1. A polyorganosiloxane comprising a repeating unit represented by formula (I) and an end cap group represented by formula (II):


(I)

(II)

said polyorganosiloxane further comprising an end group represented by formula (III), an end group represented by formula (IV), and a repeating unit represented by formula (V):


(III)


(IV)

(V)

in such a manner that the average number of the group represented by $OR^1$ directly bonded to the silicon atom is 0 or more and less than 2 per one molecule of said polyorganosiloxane,

said polyorganosiloxane having a number average molecular weight of from 500 to 100,000,

wherein from 50 to 99% by mole of R represents a methyl group, from 1 to 40% by mole of R represents a group capable of being copolymerized with a polymerizable monomer or capable of reacting with a polymer, and the balance of R represents an alkyl group having from 2 to 8 carbon atoms or an unsubstituted or substituted phenyl group; $R^1$ represents a hydrogen atom or an alkyl group having from 1 to 4 carbon atoms, plurality of $R^1$ may be the same or different; and $R^2$ represents an alkyl group having from 1 to 8 carbon atoms or an aryl group having from 6 to 8 carbon atoms, plurality of $R^2$ may be the same or different.

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**5,491,204**

## GAS BARRIER COATING FROM REACTING POLYAMINE, ALKANOLAMINE AND POLYEPOXIDE

**Richard M. Nugent, Jr.; Ken W. Niederst, both of Allison Park, and Jerome A. Seiner, Pittsburgh, all of Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.**

**Division of Ser. No. 168,351, Dec. 17, 1993, Pat. No. 5,438,109, which is a division of Ser. No. 767,458, Sep. 30, 1991, Pat. No. 5,300,541, which is a continuation-in-part of Ser. No. 656,662, Feb. 19, 1991, abandoned, which is a division of Ser. No. 367,992, Jun. 19, 1989, Pat. No. 5,008,137, which is a continuation of Ser. No. 152,176, Feb. 4, 1988, abandoned. This application Apr. 27, 1995, Ser. No. 429,442**
**Int. Cl.[6] C08G *59/50***
**U.S. Cl. 525—523** **2 Claims**

1. A polymeric gas barrier material comprising a polymeric gas resin which is a reaction product of a polyamine, an alkanolamine, and a polyepoxide, the polyepoxide having more than two epoxy groups per molecule, and the polymeric gas barrier material char-

acterized as having an amine nitrogen content of at least 14 percent by weight an oxygen permeability of less than about 1.5 cc-mil/100 in$^2$-day-atmosphere at 23° C. and zero percent relative humidity.

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**5,491,205**

## PREPARATION OF POLYMERS OF $C_2$-$C_{10}$-ALK-1-ENES USING RACEMIC METAL-LOCENE COMPLEXES AS CATALYSTS

**Franz Langhauser, Bad Dürheim; Jürgen Kerth, Carlsberg; Günther Schweier, Friedelsheim; Hans-Herbert Brintzinger, Taegerswilen; Stefan Mansel; Werner Roell, both of Constance, and Robin Kirsten, Bodman-Ludwigshafen, all of, Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Germany**

**Filed Oct. 28, 1994, Ser. No. 330,870**

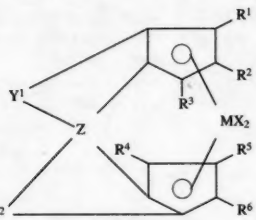
**Claims priority, application Germany, Jan. 30, 1993, 43 37 233.3**

**Int. Cl.$^6$ C08F** *4/622;10/00*

**U.S. Cl. 526—121** **1 Claim**

1. A process for the preparation of polymers of $C_2$-$C_{10}$-alk-1-enes at from 0.5 to 3000 bar and from −50° to 300° C. using a catalyst system, wherein the catalyst system used is one which contains, as active components,

a) a metallocene complex of the formula I



I

where

M is titanium, zirconium, hafnium, vanadium, niobium or tantalum,

X is fluorine, chlorine, bromine, iodine, hydrogen, $C_1$-$C_{10}$-alkyl, $C_6$-$C_{15}$-aryl or —$OR^7$,

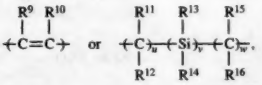
$R^7$ is $C_1$-$C_{10}$-alkyl, $C_6$-$C_{15}$-aryl, alkylaryl, arylalkyl, fluoroalkyl or fluoraryl, where each alkyl radical is of 1 to 10 carbon atoms and each aryl radical is of 6 to 20 carbon atoms,

$R^1$ to $R^6$ are each hydrogen, $C_1$-$C_{10}$-alkyl, 5-membered to 7-membered cycloalkyl, which in turn may carry $C_1$-$C_{10}$-alkyl radicals as substituents, $C_6$-$C_{15}$-aryl or arylalkyl, where two adjacent radicals together may furthermore be a cyclic group of 4 to 15 carbon atoms, or $Si(R^8)_3$

$R^8$ is $C_1$-$C_{10}$-alkyl, $C_6$-$C_{15}$-aryl or $C_3$-$C_{10}$-cycloalkyl,

Z is silicon, germanium, tin or carbon,

$Y^1$, $Y^2$ are each



or

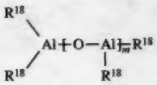


$R^9$ to $R^{16}$ are each hydrogen, $C_1$-$C_{10}$-alkyl, 5-membered to 7-membered cycloalkyl, which in turn may carry $C_1$-$C_{10}$-alkyl radicals as substituents, $C_6$-$C_{15}$-aryl or arylalkyl, where two adjacent radicals together may furthermore be a cyclic group of 4 to 15 carbon atoms, or $Si(R^{17})_3$,

$R^{17}$ is $C_1$-$C_{10}$-alkyl, $C_6$-$C_{15}$-aryl or $C_3$-$C_{10}$-cycloalkyl and

u, v, w are each an integer from 0 to 7, with the proviso that the sum is u+v+w≧2, and

b) an open-chain or cyclic alumoxane compound of the formula VI or VII



VI

VII

where

$R^{18}$ is $C_1$-$C_4$-alkyl and m is an integer from 5 to 30.

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**5,491,206**

## POLYMERIZABLE COMPOSITIONS CONTAINING OLEFIN METATHESIS CATALYSTS AND COCATALYSTS, AND METHODS OF USE THEREFOR

**Katherine A. Brown-Wensley, Lake Elmo; Michael C. Palazzotto, St. Paul; William M. Lamanna, Stillwater; Larry D. Boardman, Shoreview; John E. Gozum, Woodbury, and Fred B. McCormick, Maplewood, all of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.**

**Division of Ser. No. 992,381, Dec. 16, 1992, Pat. No. 5,296,566, which is a division of Ser. No. 811,785, Dec. 20, 1991, Pat. No. 5,198,511. This application Dec. 21, 1993, Ser. No. 172,595**

**Int. Cl.$^6$ C08F** *4/22*

**U.S. Cl. 526—126** **24 Claims**

1. A polymerizable composition comprising

a) at least one ring-strained non-conjugated cyclic olefin

b) a one-part or two-part transition metal-containing catalyst which is air and moisture stable,

wherein

1) said one-part transition-metal-containing catalyst has the formula $\{Ir(RO_2CHC{=}CHCO_2R)_2Cl\}_2$ wherein each R independently is hydrogen or lower ($C_1$ to $C_4$) alkyl, provided that the oxidation state of the metal is in the range of ∓to 0, and that cocatalysts containing C-halogen bonds are not present;

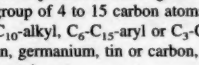
2) said two-part catalyst comprises

(a) a transition metal-containing catalyst, provided that the oxidation state of the transition metal is in the range of ∓to 0,

(b) a cocatalyst selected from the group consisting of

(i) terminal or silyl alkynes,

(ii) organosilicon compounds comprising at least one of



and

groups, and

(iii) heteroatom-substituted linear, branched, or cyclic alkenes.

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**5,491,207**

## PROCESS OF PRODUCING HIGH MOLECULAR WEIGHT ETHYLENE-α-OLEFIN ELASTOMERS WITH AN INDENYL METALLOCENE CATALYST SYSTEM

**Elvin L. Hoel, Westfield, N.J., assignor to Exxon Chemical Patents Inc., Linden, N.J.**

**Filed Dec. 14, 1993, Ser. No. 166,758**

**Int. Cl.$^6$ C08F** *4/64*

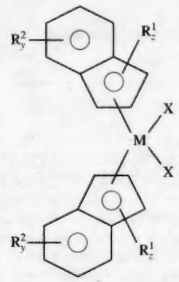
**U.S. Cl. 526—129** **16 Claims**

1. A process for producing an ethylene/α-olefin elastomeric copolymer in slurry polymerization, comprising the steps of: adding an α-olefin monomer in which an ethylene/α-olefin elastomeric copolymer is not soluble to a reaction vessel in an amount and

under pressure sufficient to allow utilization of said α-olefin in liquefied form as a polymerization diluent;

adding ethylene to said α-olefin monomer polymerization diluent in an amount sufficient to maintain a desired ethylene/α-olefin ratio in the liquid phase of the reaction vessel and;

adding to the mixture of monomers a metallocene/alumoxane catalyst system wherein the metallocene component of the catalyst is of the formula:




where M is zirconium, titanium, or hafnium; each $R^1$ and $R^2$ independently is a $C_1$ to $C_{20}$ linear or branched alkyl; X is a halide, hydride, alkyl, or aryl; and "y" and "z" are independently integer numbers of 0, 1 or 2;

reacting the mixture of olefin monomers for a time sufficient to permit copolymerization of said ethylene and α-olefin monomers to an ethylene/α-olefin elastomeric copolymer, wherein said process has less agglomeration and fouling than the process using bridged metallocene catalysts.

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**5,491,208**

**ETHYLENE-PROPYLENE ELASTOMERIC COPOLYMERS WITH A LOW CONTENT OF RESIDUAL CHLORINE**

**Tiziano Tanaglia, Bologna; Viviano Banzi, Vigarano Mainarda, and Elisa Zecchi, Ferrara, all of, Italy, assignors to Enichem Elastomeri S.r.l., Milan, Italy**

**Filed Mar. 31, 1994, Ser. No. 221,256**

**Claims priority, application Italy, Apr. 7, 1993, MI93A0691**

**Int. Cl.[6] C08F** *4/68;210/16*

**U.S. Cl. 526—143** **6 Claims**

1. A process for preparing ethylene copolymers with alpha-$C_3$–$C_{10}$-olefins, operating with the copolymer in suspension in the mixture of monomers in the liquid state, wherein

(a) the molar ratio of alpha-$C_3$–$C_{10}$-olefin(s) to ethylene in liquid phase is comprised within the range of from 7 to 15,

(b) the polymerization is carried out in the presence of a catalytic system comprising:

(i) an organic compound of vanadium, which does not contain chlorine,

(ii) a mixture of at least one alkyl-Al compound with at least one chloro alkyl-Al, such that the atomic ratio of Cl/Al is lower than, or equal to, 0.5,

(iii) a chlorinated ester,

with the molar ratio of (iii)/(i) being comprised within the range of from 1 to 10;

wherein said polymerization affords a copolymer with a content of chloride from metal-organic catalytic residues lower than 300 ppm.

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**5,491,209**

**LATEX COPOLYMERS FOR PAPER COATING COMPOSITIONS**

**Bradley J. Helmer; Shirley J. Loughney, and Jon MacDonagh-Dumler, all of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.**

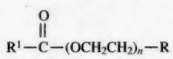
**Continuation-in-part of Ser. No. 864,748, Apr. 7, 1992, abandoned, which is a continuation-in-part of Ser. No. 426,244, Oct. 25, 1989, abandoned. This application Mar. 7, 1994, Ser. No. 207,007**

**Int. Cl.[6] C08F** *20/26*

**U.S. Cl. 526—320** **12 Claims**

1. A copolymer comprising in polymerized form:

(a) from about 1 to about 15 weight percent of one or more ethylenically unsaturated poly(ethylene glycol) monomers represented by the following formula:



where $R^1$ is an ethylenically unsaturated functional group; R is H, OH or $OCH_3$; and n is from 3 to 20;

(b) from about 60 to about 99 weight percent of a mixture of 1,3-butadiene and one or more monovinyl aromatic monomers; and

(c) from 0 to about 39 weight percent of one or more (meth-)acrylate monomers, vinylidene halide monomers, vinyl halide monomers, vinyl esters of carboxyl acids containing from 1 to 18 carbon atoms, (meth)acrylonitrile monomers, monoethylenically unsaturated carboxylic acid monomers, or a mixture thereof.

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**5,491,210**

**THERMALLY REVERSIBLE POLYMERS**

**Fidelis C. Onwumere, Norcross, and Jose F. Pazos, Roswell, both of Ga., assignors to Kimberly-Clark Corporation, Neenah, Wis.**

**Filed Apr. 21, 1989, Ser. No. 341,513**

**The portion of the term of this patent subsequent to Sep. 10, 2008, has been disclaimed.**

**Int. Cl.[6] C08G** *18/50;18/61*

**U.S. Cl. 528—28** **1 Claim**

1. A thermally reversible polymer adapted for use in meltblowing, spunbonding and film extrusion processes, the polymer comprising:

from about 50 percent to about 98.5 percent by weight, of a soft segment selected from the group including amine terminated polysiloxane, amine terminated polyethylene glycol and amine terminated polypropylene glycol; and

from about 1.5 percent to about 50 percent, by weight, of a hard segment consisting of:

at least one aromatic multifunctional isocyanate; and

a chain extender having at least two functional groups capable of reacting with the isocyanate, at least one of the functional groups being a hydroxyl group attached to an aromatic ring,

so that said polymer is adapted, upon being heated to an elevated temperature, to dissociate into melt processable polymeric fragments having a melt flow rate ranging from about 450 grams per 10 minutes to about 1000 grams per 10 minutes and upon being cooled to ambient temperature, to reassociate.

5,491,211

## BLOOM-FREE THERMOPLASTIC POLYURETHANE COMPOSITIONS

James N. Rieck, Wheeling, and Joseph M. Jupa, New Martinsville, both of W. Va., assignors to Bayer Corporation, Pittsburgh, Pa.

Filed Jun. 14, 1994, Ser. No. 259,606
Int. Cl.[6] C08G *18/30*
U.S. Cl. 528—60 16 Claims

1. A method for reducing blooming in a thermoplastic polyurethane by combining

(1) at least one hydroxy functional polyester polyol having a molecular weight of at least 500 and a hydroxyl functionality of at least 2,

(2) a chain extender,

(3) an organic diisocyanate and

(4) a chain terminator selected from monofunctional alkylene alcohols having at least 14 carbon atoms, monoisocyanates and monoamines in amounts such that an NCO/H index which is at or near 100 is achieved.

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5,491,212

## METHOD FOR PREPARING POLYSUCCINIMIDES USING A ROTARY TRAY DRYER

Yi H. Paik, Princeton, N.J.; Ethan S. Simon, Ambler, and Graham Swift, Blue Bell, both of Pa., assignors to Rohm and Haas Company, Philadelphia, Pa.

Division of Ser. No. 911,867, Jul. 10, 1992, Pat. No. 5,319,145. This application Jan. 12, 1994, Ser. No. 181,156
Int. Cl.[6] C08G *69/10*
U.S. Cl. 528—363 14 Claims

1. A continuous method for producing polysuccinimides comprising the steps of:

continuously introducing into a rotary tray dryer one or more compounds selected from the group consisting of amic acids and ammonium salts of monoethylenically unsaturated dicarboxylic acids, wherein the amic acids are monoamides of monoethylenically unsaturated dicarboxylic acids; and wherein α-amino acids are not introduced into the rotary tray dryer;

operating the rotary tray dryer so as to provide an internal temperature of from about 120° to about 300° C. and a residence time of from about 1 hour to about 10 hours; and

removing the water formed by condensation of the one or more compounds to produce polysuccinimides.

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5,491,213

## PRODUCTION OF POLYSUCCINIMIDE

Daniel A. Batzel, Skokie, Ill., assignor to Donlar Corporation, Bedford Park, Ill.

Filed Jan. 28, 1994, Ser. No. 188,525
Int. Cl.[6] C08G *69/10*; C07D *207/404*
U.S. Cl. 528—480 3 Claims

1. A method for preparing polysuccinimide which comprises:

(a) forming a reaction admixture by combining particulate maleic anhydride with a particulate ammonium salt that is thermally decomposable at a temperature below the boiling point of liquid maleic anhydride;

(b) heating said so formed admixture to a reaction temperature above the thermal decomposition temperature of said ammonium salt but below the boiling point of liquid maleic anhydride; and

(c) maintaining said so heated admixture at said reaction temperature for a time period of at least about 15 minutes.

5,491,214

## PROCESS FOR HYDROTREATING RESINS TO LIGHTEN COLOR

Norman E. Daughenbaugh, Turtle Creek, and Dane G. Goodfellow, Pittsburgh, both of Pa., assignors to Hercules Incorporated, Wilmington, Del.

Continuation of Ser. No. 37,805, Mar. 26, 1993, abandoned. This application May 5, 1995, Ser. No. 437,101
Int. Cl.[6] C08F *6/24*
U.S. Cl. 528—483 69 Claims

1. A process for lightening the color of noncrystalline hydrocarbon resins having carbon-carbon double bonds and containing color bodies, said process consisting essentially of contacting a noncrystalline hydrocarbon resin having a weight average molecular weight of 250–10,000 with hydrogen in the absence of polymerization catalyst residues and in the presence of a catalyst that promotes the hydrogenation of the color bodies without substantially changing the softening point or the content of carbon-carbon double bonds in the resin, said resin being selected from the group consisting of C-5 hydrocarbon resins, C-9 hydrocarbon resins, mixed C-5/C-9 hydrocarbon resins, vinyl aromatic-modified C-5 hydrocarbon resins, dicyclopentadiene resins, aromatic-modified dicyclopentadiene resins, terpene resins, and terpene-phenolic resins.

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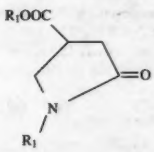
5,491,215

## ROSIN CARBOXYPYRROLIDINONE ADDUCTS

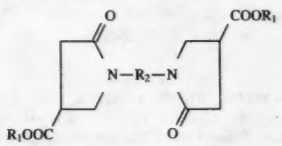
G. Frederick Hutter, Charleston, S.C., assignor to Westvaco Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 352,385, Dec. 8, 1994, abandoned. This application Apr. 11, 1995, Ser. No. 419,920
Int. Cl.[6] C09F *1/04*; C08G *63/48*
U.S. Cl. 530—212 4 Claims

1. A water-soluble resin comprising the reaction product of a rosin modified sequentially by reaction first with a member selected from the group consisting of fumaric acid, maleic acid, maleic anhydride, itaconic acid, and itaconic anhydride and, second, with a hydroxyl-containing carboxypyrrolidinone derivative having a chemical structure selected from the group consisting of



where $R_1$, independently, is a H, a $C_1$–$C_{20}$ hydrocarbyl, or a $C_1$–$C_{20}$ hydroxyl-substituted hydrocarbyl; and at least one $R_1$ contains a hydroxyl group, and



where $R_1$, independently, is a H, a $C_1$–$C_{20}$ hydrocarbyl, or a $C_1$–$C_{20}$ hydroxyl-substituted hydrocarbyl; and at least one $R_1$ contains a hydroxyl group, and $R_2$ is a $C_1$–$C_{36}$ hydrocarbyl or a $C_1$–$C_{36}$ hydroxyl-substituted hydrocarbyl.

5,491,216

## TRI-ARGININE INSULINS

James A. Hoffmann, Greenwood, and Peter K. Lambooy, Indianapolis, both of Ind., assignors to Eli Lilly and Company, Indianapolis, Ind.

Division of Ser. No. 801,163, Nov. 26, 1991, abandoned. This application Jul. 6, 1993, Ser. No. 87,831

Int. Cl.[6] A61K *38/28;* C07K *14/62*

U.S. Cl. 530—303 4 Claims

1. Split(64) proinsulin-tri-arg-analog consisting of human proinsulin wherein the B3 and A21 residues are selected from the group consisting of Ala, Arg, Asx, Cys, Glx, Gly, His, Ile, Leu, Lys, Met, Phe, Pro, Ser, Thr, Trp, Tyr or Val, the B10 residue is selected from the group consisting of His, Asp or Glu, and wherein the amide bond between Lys-64 and Arg-65 is broken, or a pharmaceutically acceptable salt thereof.

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5,491,217

## LHRH ANTAGONISTS HAVING MODIFIED AMINOACYL RESIDUES AT POSITIONS 5 AND 6

Fortuna Haviv, Deerfield; Jonathan Greer, Chicago; Rolf E. Swenson, Grayslake, and Daryl R. Sauer, Gurnee, all of Ill., assignors to TAP Holding Inc., Abbott Park, Ill.

Continuation of Ser. No. 993,202, Dec. 18, 1992, abandoned. This application Jul. 28, 1994, Ser. No. 282,411

Int. Cl.[6] A61K *38/24;* C07K *7/23*

U.S. Cl. 530—313 3 Claims

1. A compound or pharmaceutically acceptable salt thereof selected from the group consisting of

NAc—D-2Nal —D-4ClPhe—D-3Pal—Ser—NMe—(4-Atza)Phe—D—(4-Atza)Phe— Leu—Lys(Isp)—Pro—D—$AlaNH_2$;

NAc—D2Nal—D4ClPhe—D3Pal—Ser—NMe(4-Atza)Phe—DLys(Nic)—Leu— Lys(Isp)—Pro—D—$AlaNH_2$;

NAc—D-2Nal—D—4ClPhe—D-3-Pal—Ser—NMeTyr—D—(4-Atza)Phe—Leu— Lys(Isp)—Pro—D—$AlaNH_2$.

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5,491,218

## ARTIFICIAL POSITIVE CONTROLS DERIVED FROM BIFUNCTIONAL CONJUGATES

Stefan Brust, Marburg-Michelbach; Heinz-Juergen Friesen, Marburg; Guenther Nau, Marburg-Schroeck, and Hans-Erwin Pauly, Dautphetal, all of, Germany, assignors to Behringwerke Aktiengesellschaft, Marburg, Germany

Continuation of Ser. No. 958,713, Oct. 9, 1992, abandoned. This application Apr. 1, 1994, Ser. No. 221,447

Claims priority, application Germany, Jan. 14, 1991, 41 33 945.2

Int. Cl.[5] C07K *16/42;16/08;* G01N *33/531*

U.S. Cl. 530—387.3 5 Claims

1. A bi-functional conjugate comprising an antibody of nonhuman origin, wherein said conjugate has:

i) a first binding site that specifically binds a specific pathogen; and

ii) a second binding site that specifically binds a specific class of immunoglobulin.

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5,491,219

## FERRITIN WITH FERRIMAGNETICALLY ORDERED FERRITE CORE AND METHOD TECHNICAL FIELD

Stephen Mann, Bath, United Kingdom, assignor to Protein Magnetics, San Luis Obispo, Calif.

Filed Jun. 11, 1993, Ser. No. 76,718

Int. Cl.[6] C07K *16/00;* C04B *35/00;35/26;* H01F *1/03*

U.S. Cl. 530—391.1 11 Claims

1. Ferritin product having a ferrimagnetically ordered core, in which said core comprises magnetite or maghemite, has a face-centered cubic spinel crystal structure in the size of up to 10 nm, has a magnetic dipole moment per particle above $10^{-17}$ ergs/gauss, has a blackish or red/brown appearance in dilute aqueous solution and is perceptibly attracted to a samarium-cobalt permanent magnet.

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5,491,220

## SURFACE LOOP STRUCTURAL ANALOGUES OF FIBROBLAST GROWTH FACTORS

Andrew P. Seddon, Monroe; Luyuan Li, New City; Peter Böhlen, Peekskill, all of N.Y.; Magdalena Eisinger, Demarest, N.J., and Avner Yayon, Moshav Sitra, Israel, assignors to Yeda Research and Development Co., Ltd., Rehovat, Israel, and American Cyanamid Company, Wayne, N.J.

Continuation-in-part of Ser. No. 126,973, Sep. 24, 1993, abandoned. This application Aug. 15, 1994, Ser. No. 290,373

Int. Cl.[6] C07K *14/50;* C12N *15/18*

U.S. Cl. 530—399 9 Claims

1. An FGF-2 analogue wherein the amino acids corresponding to FGF-2 amino acids 118 to 122 of SEQ ID NO: 1 have been replaced with an amino acid sequence selected from the group consisting of

(a) FGF-1 amino acids 112–123 of SEQ ID NO: 2,
(b) FGF-1 amino acids 115–121 of SEQ ID NO: 2,
(c) FGF-3 amino acids 132–152 of SEQ ID NO: 4,
(d) FGF-4 amino acids 172–176 of SEQ ID NO: 5,
(e) FGF-5 amino acids 176–186 of SEQ ID NO: 6,
(f) FGF-6 amino acids 174–178 of SEQ ID NO: 7,
(g) FGF-7 amino acids 154–162 of SEQ ID NO: 8,
(h) FGF-8 amino acids 144–148 of SEQ ID NO: 9,
(i) FGF-9 amino acids 151–161 of SEQ ID NO: 10, and
(j) interleukin-113 amino acids 231–235 of SEQ ID NO: 3

wherein said analogue is capable of binding to heparin.

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5,491,221

## FIBRE-REACTIVE COPPER-COMPLEX FORMAZAN COMPOUNDS WHICH CONTAIN A DIFLUOROPYRIMIDINYL GROUP

Markus Gisler, Rheinfelden, Switzerland, and Roland Wald, Huningue, France, assignors to Sandoz Ltd., Basel, Switzerland

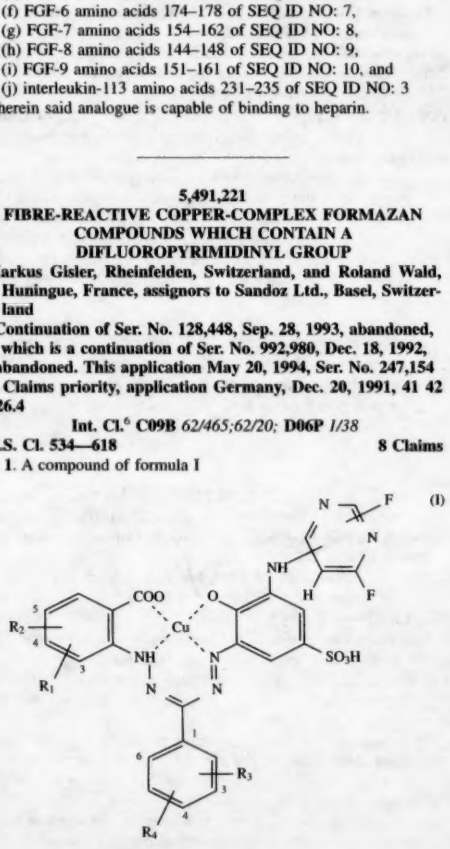
Continuation of Ser. No. 128,448, Sep. 28, 1993, abandoned, which is a continuation of Ser. No. 992,980, Dec. 18, 1992, abandoned. This application May 20, 1994, Ser. No. 247,154

Claims priority, application Germany, Dec. 20, 1991, 41 42 126.4

Int. Cl.[6] C09B *62/465;62/20;* D06P *1/38*

U.S. Cl. 534—618 8 Claims

1. A compound of formula I



or a salt thereof, or a mixture of such compounds or salts, in which:

$R_1$ is hydrogen,

$R_2$ is $—SO_3H$ in the 4 or 5 position,

$R_3$ is hydrogen,

$R_4$ is $—NHCOCHY_2—CH_2Y_1$, or $—NHCOCY_2=CH_2$,

$Y_1$ is chlorine, bromine, $—OSO_3H$ or $—SSO_3H$,

$Y_2$ is hydrogen, chlorine or bromine.

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**5,491,222**

**Patent Not Issued For This Number**

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**5,491,223**

**POLYSACCHARIDE DERIVATIVE AND SEPARATING AGENT**

**Yoshio Okamoto, Aichi, Japan, assignor to Daicel Chemical Industries, Ltd., Osaka, Japan**

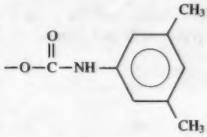
**Continuation-in-part of Ser. No. 877,178, Jun. 25, 1992, abandoned. This application Apr. 13, 1993, Ser. No. 47,118**

**Claims priority, application Japan, Feb. 28, 1991, 3-034049**

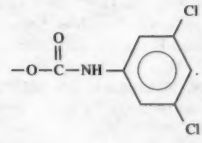
**Int. Cl.[6] C08B** *37/00*

**U.S. Cl. 536—18.7** **6 Claims**

2. In a separating agent used for resolving a racemic modification into optical isomers, the improvement comprising said separating agent comprising a polysaccharide having hydroxyl groups replaced by different substituents at the 2- or 3-position and 6-position, said substituents being a 3,5-dimethylphenylcarbamate group represented by the following formula (I) and a 3,5-dichlorophenylcarbamate group represented by the following formula (II) as the sole substituents at the 2- or 3- and 6-position:



(I)



(II)

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**5,491,224**

**DIRECT LABEL TRANSAMINATED DNA PROBE COMPOSITIONS FOR CHROMOSOME IDENTIFICATION AND METHODS FOR THEIR MANUFACTURE**

**Michael L. Bittner, 1768 Brookdale Rd., Naperville, Ill. 60563; Larry E. Morrison, 21 W. 559 Kensington Rd., Glen Ellyn, Ill. 60137, and Mona S. Legator, 6540 N. Francisco, Chicago, Ill. 60645**

**Continuation of Ser. No. 762,913, Sep. 19, 1991, abandoned, which is a continuation-in-part of Ser. No. 585,876, Sep. 20, 1990, abandoned. This application Apr. 4, 1994, Ser. No. 222,167**

**Int. Cl.[6] C07H** *21/04;21/00;* **C12Q** *1/68*

**U.S. Cl. 536—22.1** **16 Claims**

1. A direct label probe composition for staining the DNA present in a chromosome or region of a chromosome comprising multiple DNA segments complementary to different portions of said chromosome or chromosome region to be detected wherein (a) said DNA segments include multiple fluorescent labels covalently linked to the DNA segments via transaminated cytosine sites and (b) 0.3 to 6 mole percent of bases in the DNA segments are fluorescently labeled.

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**5,491,225**

**PCR PRIMERS FOR DETECTION OF LEGIONELLA SPECIES AND METHODS FOR CONTROLLING VISUAL INTENSITY IN HYBRIDIZATION ASSAYS**

**Teresa K. H. Picone, Benicia; Theresa M. McCallum, Pleasant Hill, and Michael A. Zoccoli, Moraga, all of Calif., assignors to Hoffmann-La Roche Inc., Nutley, N.J.**

**PCT No. PCT/US91/09688, § 371 Date May 27, 1993, § 102(e) Date May 27, 1993, PCT Pub. No. WO92/11273, PCT Pub. Date Jul. 9, 1992**

**PCT Filed Dec. 19, 1991, Ser. No. 70,328**

**Int. Cl.[6] C07H** *21/04;* **C12Q** *1/68;* **C12P** *19/34;* **C12N** *15/00*

**U.S. Cl. 536—24.32** **16 Claims**

1. Nucleic acid polymerase primers for the amplification of subsequences of nucleic acid from Legionella species, wherein the primers are selected from the group consisting of

(a) 5'-GCATTGGTGCCGATTTGG-3', Seq. ID No. 6;

(b) 5'-GCTTTGCCATCAAATCTTTCTGAA-3', Seq. ID No. 7;

(c) 5'-GGCGACTATAGCGRTTTGGAA-3', Seq. ID No. 10;

(d) 5'-GCGATGACCTACTTTCRCATGA-3', Seq. ID No. 9; and

(e) 5'-GTTTTGCCATCAAATCTTFTTGAA-3', Seq. ID No. 23

where R represents an adenine or a guanine base and the primers having a base R are a mixture of the two primers.

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**5,491,226**

**PROCESS FOR PREPARING POLYOL POLYESTERS HAVING LOW LEVELS OF TRIGLYCERIDES**

**Corey J. Kenneally, Maineville, Ohio, assignor to Procter & Gamble Company, Cincinnati, Ohio**

**Filed Apr. 6, 1994, Ser. No. 223,624**

**Int. Cl.[6] C07H** *1/00;13/06;13/12;15/04*

**U.S. Cl. 536—115** **14 Claims**

1. A process for preparing fat-free nondigestible polyol fatty acid polyesters, which process comprises the steps of:

A. preparing fatty acid monohydric lower alkyl esters having a level of monoglycerides below 500 ppm, a non-detectable level of di- and triglyceride and a glycerine level below 200 ppm by (1) reacting a fatty acid glycerol ester with a monohydric lower alkyl alcohol in the presence of a suitable catalyst to produce a mixture of fatty acid monohydric lower alkyl esters, fatty acid glycerol esters and glycerol; (2) separating the mixture produced in step (1) into a glycerine phase and a fatty acid monohydric lower alkyl ester-containing phase which fatty acid monohydric lower alkyl ester-containing phase has a level of residual mono-, di-, and triglycerides below 2.5%; (3) water washing the fatty acid monohydric lower alkyl ester-containing phase under conditions suitable to provide a fatty acid monohydric lower alkyl ester phase containing less than 300 ppm glycerine, and (4) distilling the fatty acid monohydric lower alkyl esters under conditions suitable to provide fatty acid monohydric lower alkyl esters having a level of monoglycerides below 500 ppm, a non-detectable level of di- and triglyceride and a glycerine level below 200 ppm; and

B. transesterifying the fatty acid monohydric lower alkyl esters and a polyol to provide a polyol fatty acid polyester having a triglyceride level of less than 0.5% in a solvent-free two-stage process wherein the first stage comprises forming polyol fatty acid partial esters from a reaction mixture containing a polyol having more than 4 esterifiable hydroxy groups and at least a portion of the fatty acid esters of the easily removable alcohol in the presence of an effective amount of a basic catalyst and optionally an effective amount of soap emulsifier, and wherein the second stage comprises forming highly esterified polyol fatty acid polyesters from a reaction mixture containing the

polyol fatty acid partial esters, the remaining portion of the fatty acid esters and an effective amount of a basic catalyst.

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**5,491,227**

**CONTROLLED MOLECULAR WEIGHT REDUCTION OF POLYMERS**

**Robert D. Casson, and John A. Lovelady, both of Kent, England, assignors to Genzyme Limited, United Kingdom**

**Filed Mar. 2, 1994, Ser. No. 204,580**

**Int. Cl.[6] C07G *17/00***

**U.S. Cl. 536—124** **1 Claim**

1. A method for the controlled number average molecular weight reduction of an aqueous solution of hyaluronic acid comprising:

subjecting the hyaluronic acid to pressure homogenization in a single passage at a pressure of from about 10 to about 25 MPa, and

obtaining a hyaluronic acid solution wherein said hyaluronic acid has a number average molecular weight of from about 1.2 to about $1.5 \times 10^6$D.

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**5,491,228**

**PREPARATIVE PROCESSES FOR DIHYDROXYGERMANIUM PHTHALOCYANINE**

**Beng S. Ong, and Cheng-Kuo Hsiao, both of Mississauga, Canada, assignors to Xerox Corporation, Stamford, Conn.**

**Filed Apr. 18, 1994, Ser. No. 228,619**

**Int. Cl.[6] C09B *67/50***

**U.S. Cl. 540—128** **19 Claims**

1. A process for the preparation of Type III dihydroxygermanium phthalocyanine consisting essentially of admixing dihalogermanium phthalocyanine or dialkoxygermanium phthalocyanine with a concentrated acid, followed by contact with water, and then washing with an organic base and an aprotic organic solvent, and wherein said Type III dihydroxygermanium phthalocyanine displays an X-ray powder diffraction pattern with peaks at Bragg angles (2°) of 8.0, and with peaks at Bragg angles (2°) of 8.0°, 8.7°, 10.9°, 12.1°, 12.8°, 15.0°, 16.0°, 16.7°, 17.3°, 17.7°, 18.3°, 18.4°, 19.8°, 21.5°, 22.5°, 23.0°, 24.7°, 25.6°, 27.5°, 28.8°, 30.0°, and 31.9.

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**5,491,229**

**RAPAMYCIN DERIVATIVE**

**Peter R. Shelley, Dorking, England, assignor to SmithKline Beecham PLC, Brentford, England**

**PCT No. PCT/GB92/02235, § 371 Date Jun. 1, 1994, § 102(e) Date Jun. 1, 1994, PCT Pub. No. WO93/11130, PCT Pub. Date Jun. 10, 1993**

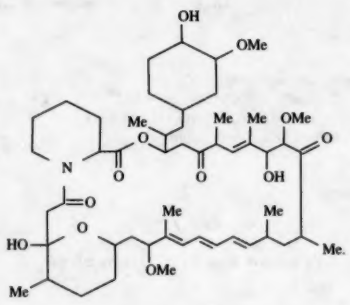
**PCT Filed Dec. 1, 1992, Ser. No. 244,510**

**Claims priority, application United Kingdom, Dec. 3, 1991, 9125660**

**Int. Cl.[6] A61K *31/305;* C07D *491/00***

**U.S. Cl. 540—456** **3 Claims**

1. A compound of formula (I):



(I)

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**5,491,230**

**ANIONIC POLYMERIZATION INITIATORS CONTAINING ADDUCTS OF CYCLIC SECONDARY AMINES AND CONJUGATED DIENES, AND PRODUCTS THEREFROM**

**David F. Lawson, Uniontown; Thomas A. Antkowiak, Wadsworth; James E. Hall, Mogadore, and Mark L. Stayer, Jr., Suffield, all of Ohio, assignors to Bridgestone Corporation, Tokyo, Japan**

**Filed Dec. 29, 1993, Ser. No. 175,294**

**Int. Cl.[6] C07D *225/00***

**U.S. Cl. 540—450** **9 Claims**

1. An anionic polymerization initiator comprising:

a carbon-lithio salt of the adduct of a cyclic secondary amine with a conjugated diene;

wherein said adduct is selected from the group consisting of 1,4- and 4,1-addition products of said amine with said diene.

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**5,491,231**

**HINDERED N-OXIDE ESTERS OF RAPAMYCIN**

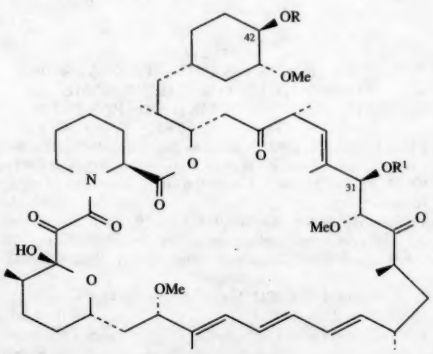
**Frances C. Nelson, and Guy A. Schiehser, both of Yardley, Pa., assignors to American Home Products Corporation, Madison, N.J.**

**Filed Nov. 28, 1994, Ser. No. 345,972**

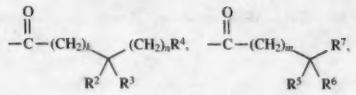
**Int. Cl.[6] A61K *31/395;* C02D *491/06***

**U.S. Cl. 540—456** **7 Claims**

1. A compound of the structure



wherein R and $R^1$ are each, independently,



or hydrogen;

$R^2$ and $R^3$ are each independently, alkyl of 1–6 carbon atoms, arylalkyl of 7–10 carbons, or $R^2$ and $R^3$ may be taken together to form a cycloalkyl ring of 3–8 carbon atoms;

$R^4$ is a heterocyclic N-oxide radical selected from the group consisting of 1-methyl-pyrazolyl- 2-N-oxide, imidazoyl-3-N-oxide, 1,2,3-triazolyl 2- or 3-N-oxide, 1,2,4-triazolyl 2- or 4-N-oxide, 1,2,5-oxadiazolyl N-oxide, 1,2,3,5-oxatriazolyl N-oxide, pyridinyl N-oxide, pyridazinyl N-oxide, pyrimidinyl N-oxide, pyrazinyl N-oxide, 1,3,5-triazinyl N-oxide, 1,2,4-triazinyl N-oxide, 1,2,3-triazinyl N-oxide, 1,2,4-diazepinyl N-oxide, 2-isobenzazolyl N-oxide, 1,5-pyrindinyl N-oxide, benzpyrazolyl N-oxide, benzisoxazolyl N-oxide, benzoxazolyl N-oxide, quinolinvl N-oxide, isoquinolinyl N-oxide, cinnolinyl N-oxide, quinazolinyl N-oxide, naphthyridinyl N-oxide, pyrido[3,4-b] pyridinyl N-oxide, pyrido[4,3-b]pyridinyl N-oxide, pyrido[2.3-b]pyridinyl N-oxide, 1,4,2-benzoxazinyl N-oxide, 2,3,1-benzoxazinyl N-oxide, carbazolyl N-oxide, and purinyl N-oxide, which may be optionally mono-, di-, or tri- substituted with a group selected from alkyl of 1–6 carbon atoms, arylalkyl of 7–10 carbon atoms, alkoxy of 1–6 carbon atoms, cyano, halo, hydroxy, nitro, carbalkoxy of 2–7 carbon atoms, trifiuoromcthyl, trifiuoromethoxy, hydroxyalkyl of 1–6 carbon atoms, alkoxyalkyl of 2–12 carbon atoms, $—SO_3H$, $—PO_3H_2$, and $—CO_2H$;

$R^5$ is alkyl of 1–6 carbon atoms or arylalkyl of 7–10 carbon atoms;

$R^6$ and $R^7$ are taken together to form a saturated N-alkyl of 1–6 carbon atoms-heterocyclic N-oxide of 5–8 ring atoms, which may be optionally mono-, di-, or tri-substituted with a group selected from alkyl of 1–6 carbon atoms, aroyl of 3–11 carbon atoms, and perfluoroalkyl of 1–6 carbon atoms;

k=0–1,

m=0–1;

n=1–6;

with the proviso that R and $R^1$ are not both hydrogen.

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**5,491,232**

## SULFUR COMPOUNDS USEFUL FOR PREPARATION OF DYES

**Manfred Patsch, Wachenheim, and Ernst Schefczik, Ludwigshafen, both of, Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Germany**

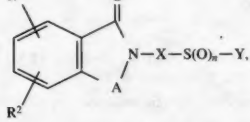
**Filed Apr. 18, 1995, Ser. No. 423,849**

**Claims priority, application Germany, Apr. 28, 1994, 44 14 880.1**

**Int. Cl.[6] C07D** *279/02;209/48*

**U.S. Cl. 544—3** **4 Claims**

**1**. A sulfur compound of the formula I



(I)

where

n is 0 or 2,

$R^1$ and $R^2$ independently of one another in each case are hydrogen, $C_1$–$C_6$-alkyl, $C_1$–$C_6$-alkoxy, halogen, nitro, amino, hydroxysulfonyl, $C_1$–$C_6$-alkoxycarbonyl, carbamoyl or $C_1$–$C_6$-mono- or dialkylcarbamoyl,

A is methylene, carbonyl, sulfonyl or a radical of the formula $CH_2$—CO or $CH_2$—$SO_2$, the methylene group in each case being linked to the benzene ring,

X is a direct bond, $C_1$–$C_8$-alkylene which may be interrupted by 1 to 3 oxygen atoms in ether linkage, 1 to 3 imino groups or 1 to 3 $C_1$–$C_4$-alkylimino groups, or a radical of the formula $L^1$—CO—$NR^3$—$L^2$, where $L^1$ and $L^2$ independently of one another in each case are $C_1$–$C_4$-alkylene and $R^3$ is hydrogen, $C_1$–$C_4$-alkyl or phenyl, and

Y is vinyl or a radical of the formula $C_2H_4Q$, where Q is hydroxyl or a group which can be removed under alkaline reaction conditions.

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**5,491,233**

## CATALYTIC ASYMMETRIC REDUCTION OF TRISUBSTITUTED OLEFINS

**Stephen L. Buchwald, Somerville, Mass.; Richard D. Broene, Brunswick, Me., and Nancy E. Lee, Brookline, Mass., assignors to Massachusetts Institute of Technology, Cambridge, Mass.**

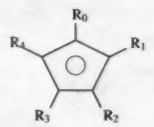
**Continuation-in-part of Ser. No. 90,338, Jul. 12, 1993, Pat. No. 5,442,119, and Ser. No. 195,358, Feb. 10, 1994. This application Jul. 12, 1994, Ser. No. 273,842**

**Int. Cl.[6] C07D** *265/30;207/46;* **C07C** *209/00;43/02;21/00*

**U.S. Cl. 544—174** **2 Claims**

**1**. A catalytic asymmetric reduction process, comprising the steps of:

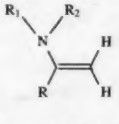
providing a catalytic amount of an active species of an enantiomerically enriched chiral catalyst selected from the group consisting of M(L)(L')(L"), M(L)(L')(L")(L"), M(L)(L')(L")(L"')($L^{iv}$), and M(L)(L')(L")(L"')($L^{iv}$)($L^{v}$), where M is a group 3, 4, 5 or 6 metal. a lanthanide or an actinide, and L, L', **L41** , L"', $L^{iv}$, $L^{v}$, independently, is any combination of H, alkyl, aryl, Si(R)(R')(R"), halogen, — OR, —SR, or —NR(R'), PR(R')(R"), or a cyclopentadienyl group having the formula



wherein R, R', and R" are H alkyl, aryl, or silyl and are the same or different, and where $R_0$, $R_1$, $R_2$, $R_3$, and $R_4$ are hydrogen, alkyl, aryl, Si(R)(R')(R"), halogen. —OR, — SR, — NR(R'), PR(R')(R"), or —PR(R') groups in any combination, where R, R', and R" are as defined above;

providing a rate enhancing additive selected from an acidic compound, present in an amount ranging from 0.01 to 100 equivalents relative to the catalyst;

reacting a substrate selected from the group consisting of trisubstituted olefins and enamines in the presence of hydrogen and the catalyst, the enamine substrate having the formula;



where R is an alkyl group (saturated or unsaturated), an aryl group, a heteroaromatic group, and $R_1$ and $R_2$ are hydrogen, akyl groups (saturated or unsaturated), aryl groups, heteroaromatic groups, or a substituted version thereof, except that $R_1$ and $R_2$ are not of the formula C(O)$R_3$; and

recovering and purifying a reduced organic reaction product having a high level of enantiomeric purity.

## 5,491,234
## PYRIMIDINE DERIVATIVES FOR ENHANCING ANTITUMOR ACTIVITY

**Jotham W. Coe, Mystic; Anton F. J. Fliri, Norwich; Takushi Kaneko, Guilford, and Eric R. Larson, Mystic, all of Conn., assignors to Pfizer Inc., New York, N.Y.**

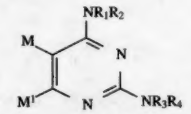
**PCT No. PCT/US92/02434, § 371 Date Oct. 14, 1993, § 102(e) Date Jan. 31, 1994, PCT Pub. No. WO92/18498, PCT Pub. Date Oct. 29, 1992**

**PCT Filed Mar. 30, 1992, Ser. No. 129,196**

**Int. Cl.**[6] **C07D** *239/02;401/04;* **A61K** *31/505*

**U.S. Cl. 544—325** **14 Claims**

1. A compound of the formula



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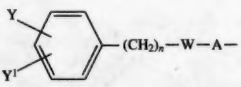
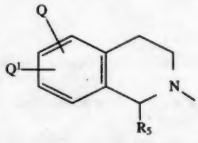
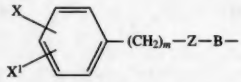
or the pharmaceutically acceptable acid addition salt thereof wherein M is hydrogen, alkoxy having one to three carbon atoms, alkyl having one to three carbon atoms or benzyl optionally substituted by one or two alkoxy substituents each having one to three carbon atoms, amino, alkylamino having one to three carbon atoms, dialkylamino having two to six carbon atoms, fluoro, chloro or trifluoromethyl; $M^1$ is hydrogen, amino, alkylamino having one to three carbon atoms, dialkylamino having two to six carbon atoms, alkyl having one to three carbon atoms, fluoro or chloro; $R_1$ is aralkyl of the formula



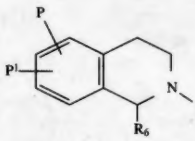
wherein n is an integer of 0 or 1, W is O, S or a chemical bond, A is alkylene having one to four carbon atoms, Y and $Y^1$ are each hydrogen, alkyl having one to three carbon atoms, alkoxy having one to three carbon atoms, fluoro, chloro, trifluoromethyl, amino, alkylamino having one to three carbon atoms or dialkylamino having two to six carbon atoms and Y and $Y^1$ when taken together are ethylenedioxy or methylenedioxy; $R_2$ is hydrogen or alkyl having one to eight carbon atoms; $R_1$ and $R_2$ when taken together with the nitrogen atom to which they are attached form a moiety of the formula



wherein $R_5$ is hydrogen, alkyl having one to three carbon atoms or dialkoxyphenylalkyl said alkoxy having one to three carbon atoms and said alkyl having from one to three carbon atoms, Q and $Q^1$ are each hydrogen, alkyl having one to three carbon atoms, alkoxy having one to three carbon atoms, fluoro, chloro, amino, alkylamino having one to three carbon atoms, trifluoromethyl or dialkylamino having two to six carbon atoms and Q and $Q^1$ taken together are methylenedioxy or ethylenedioxy; $R_3$ is aralkyl of the formula



wherein m is an integer of 0 or 1, Z is O, S or a chemical bond, B is alkylene of one to four carbon atoms, X and $X^1$ are each hydrogen, alkyl having one to three carbon atoms, alkoxy having one to three carbon atoms, fluoro, chloro, trifluoromethyl, amino, alkylamino having one to three carbon atoms or dialkylamino having two to six carbon atoms and X and $X^1$ taken together are methylenedioxy or ethylenedioxy; $R_4$ is hydrogen or alkyl having one to four carbon atoms; and $R_3$ and $R_4$ when taken together with the nitrogen atom to which they are attached form a moiety of the formula



wherein P and $P^1$ are each hydrogen, alkyl having one to three carbon atoms, alkoxy having one to three carbon atoms, fluoro, chloro, trifluoromethyl, amino, alkylamino having one to three carbon atoms or dialkylamino having two to six carbon atoms, P and $P^1$ when taken together are methylenedioxy or ethylenedioxy and $R_6$ is hydrogen or dialkoxybenzyl said alkoxy having one to three carbon atoms.

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## 5,491,235
## PROCESS FOR THE PREPARATION OF ORGANIC PIGMENTS

**Margot Campos, Charleston; Dirk Pfuetzenreuter, Summerville; Guenter Franke, and Michael J. Greene, both of Mt. Pleasant, all of S.C., assignors to Bayer Corporation, Pittsburgh, Pa.**

**Filed May 6, 1994, Ser. No. 239,180**

**Int. Cl.**[6] **C09B** *48/00;* **C07D** *471/04*

**U.S. Cl. 546—57** **14 Claims**

1. A process for the preparation of quinacridone pigments comprising

(a) heating, at a temperature of 80° C. to 145° C., a reaction mixture comprising

(i) 2,5-dianilinoterephthalic acid or a 2,5-dianilinoterephthalic acid derivative having one or more substituents in at least one aniline ring,

(ii) 2 to 10 pads by weight, relative to component (i), of a strong acid, and

(iii) at least 0.4 mole percent, relative to component (i) , of iron in the form of an iron salt;

(b) drowning the reaction mixture from step (a) by adding said reaction mixture to 3 to 15 pads by weight, relative to component (i), of a liquid in which the pigment is substantially insoluble;

(c) isolating the quinacridone pigment; and

(d) optionally, conditioning the quinacridone pigment.

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## 5,491,236
## (1,2N) AND (3,2N)-CARBOCYCLIC-2-AMINO TETRALIN DERIVATIVES

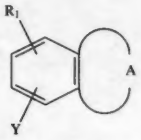
**Chiu-Hong Lin, Kalamazoo, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.**

**Continuation of Ser. No. 379,526, Jul. 13, 1989, abandoned. This application Dec. 4, 1991, Ser. No. 803,287**

**Int. Cl.**[6] **C07D** *209/60;* **A61K** *31/40*

**U.S. Cl. 546—101** **10 Claims**

1. A compound having the formula



where Y is hydrogen or halogen

wherein $R_1$ is

(a) hydrogen

(b) —$OR_4$

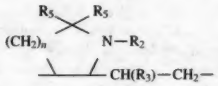
(c) —$SR_4$

(d) —$OSO_2CF_3$

(e) —$CONR_6R_6$ (except that when A is (a) only one $R_6$ can be hydrogen)

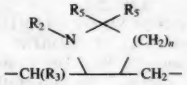
(f) —CO—(2-pyrrolyl)

wherein A is



a

or



wherein $R_2$ is

(a) -hydrogen

(b) —$(C_1$–$C_8)$ alkyl

(c) —$(C_3$–$C_8)$ alkenyl

(d) —$(C_3$–$C_8)$ alkynyl

(e) —$(CH_2)_m$—$(C_3$–$C_8)$cycloalkyl

(f) —$(CH_2)_m$—$(C_3$–$C_8)$cycloalkenyl

(j) —$(CH_2)_m$-aryl

(h) —$(CH_2)_m$—$CO_2R_6$

wherein $R_3$ is

(a) -hydrogen

(b) —$(C_1$–$C_4)$alkyl

(c) -aryl

(d) —$(CH_2)_n$—CO—$(C_1$–$C_4)$alkyl

(e) —CO-aryl

wherein $R_4$ and $R_5$ are

(a) -hydrogen

(b) —$(C_1$–$C_4)$-alkyl

(c) —$(C_2$–$C_4)$alkenyl

(d) -aryl

wherein $R_6$ is

(a) -hydrogen

(b) —$(C_1$–$C_4)$alkyl

(c) -aryl

wherein m is 1 to 4 and n is 0 or 1 with the provisos that when A is formula a and Y is hydrogen, $R_2$ is hydrogen or methyl and n is 1, then $R_1$ cannot be hydrogen, hydroxy or alkoxy.

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**5,491,237**

**INTERMEDIATES IN PHARMACEUTICAL CAMPTOTHECIN PREPARATION**

**Francis G. Fang, Durham; Melissa W. Lowery, Raleigh, and Shiping Xie, Cary, all of N.C., assignors to Glaxo Wellcome Inc., Research Triangle Park, N.C.**

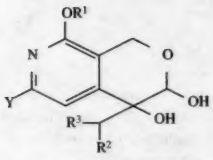
**Filed May 3, 1994, Ser. No. 237,081**

**Int. Cl.[6] C07D** *491/052*

**U.S. Cl. 546—116** **34 Claims**

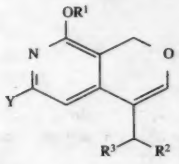
1. A method of synthesizing a compound of Formula (V)

I



(V)

which comprises dihydroxylating a compound of Formula (III)



(III)

a wherein:

$R^1$ represents alkyl, $R^2$ and $R^3$ represent H or alkyl; and Y is selected from the group consisting of: chloro, H or $OR^4$, wherein $R^4$ represents alkyl, trifluoromethanesulphonate or H.

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**5,491,238**

**PROCESS FOR MAKING HIV PROTEASE INHIBITORS**

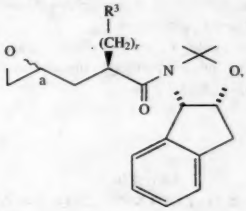
**David Askin, Warren; Ralph P. Volante, Cranbury, and Kan K. Eng, Jersey City, all of N.J., assignors to Merck & Co., Inc., Rahway, N.J.**

**Division of Ser. No. 187,664, Jan. 26, 1994, and a continuation-in-part of Ser. No. 93,225, Jul. 16, 1993, abandoned. This application Jun. 2, 1995, Ser. No. 458,379**

**Int. Cl.[6] C07D** *213/06;263/52*

**U.S. Cl. 546—270** **3 Claims**

b 1. A compound of formula IV



IV

wherein:

stereocenter a is in either the R configuration, the S configuration or is racemic;

r is an integer from zero through and including 5;

$R^3$ is selected from the group consisting of:

1) hydrogen,

2) —$C_{1-4}$ alkyl

3) $C_5$–$C_{10}$ cycloalkyl, optionally substituted with hydroxy,

4) $C_6$–$C_{10}$ aryl, unsubstituted or substituted with one or more of:

a) halo,

b) hydroxy,

c) —$NO_2$ or —$N(R)_2$,

d) $C_{1-4}$ alkyl,

e) $C_{1-3}$ alkoxy, unsubstituted or substituted with one or more of —OH or $C_{1-3}$ alkoxy,

f) —COOR,

g) —$CON(R)_2$,

h) —$CH_2N(R)_2$,

i) —$CH_2NHCOR$,

j) —CN,

k) —$CF_3$,

l) —NHCOR,

m) aryl $C_{1-3}$ alkoxy,

n) aryl,
o) —$NRSO_2R$,
p) —$OP(O)(OR_x)_2$, or
q) —$R^5$, as defined below, or

5) monocyclic or bicyclic heterocycle containing from 1 to 3 heteroatoms chosen from the group consisting of N, O, and S, and which is unsubstituted or substituted with $R^5$ and optionally with one or more of
a) halo,
b) $C_{1-4}$ alkyl, or
c) $C_{1-3}$ alkoxy;

R is hydrogen or $C_{1-4}$ alkyl;
$R_x$ is H or aryl; and
$R^5$ is

1) —$W—(CH_2)_m—NR^6R^7$ wherein W is —O— or —S—, m is 2, 3, 4 or 5, and $R^6$ and $R^7$ are independently selected at each occurrence from:
a) hydrogen,
b) $C_{1-6}$ alkyl, unsubstituted or substituted with one or more of
i) $C_{1-3}$ alkoxy,
ii) —OH, or
iii) —$N(R)_2$,
c) aromatic heterocycle unsubstituted or substituted with one or more of
i) $C_{1-4}$ alkyl, or
ii) —$N(R)_2$,
d) or $R^6$ and $R^7$ are joined together with the nitrogen to which they are attached to form a 5–7 member heterocycle containing up to two additional heteroatoms selected from —N(R), —O—, —S—, —S(O)— or —$S(0)_2$—, the heterocycle optionally substituted with $C_{1-4}$ alkyl,
2) —$(CH_2)_q—NR^6R^7$ wherein q is an integer from 1–5, and $R^6$ and $R^7$ are defined above, except that $R^6$ or $R^7$ are not H or unsubstituted $C_{1-6}$ alkyl, or
3) benzofuryl, indolyl, azacycloalkyl, azabicyclo $C_{7-11}$ cycloalkyl, or benzopiperidinyl, unsubstituted or substituted with $C_{1-4}$ alkyl.

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**5,491,239**

## METHOD FOR HALOGENATING AN AROMATIC COMPOUND

**Rikuo Nasu; Motohiko Hamaguchi, and Hayato Ariyoshi, all of Yokkaichi, Japan, assignors to Ishihara Sangyo Kaisha Ltd., Osaka, Japan**

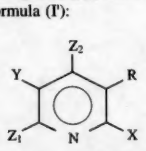
**Filed Nov. 2, 1993, Ser. No. 144,525**

**Claims priority, application Japan, Nov. 4, 1992, 4-336537; Nov. 20, 1992, 4-352273; Dec. 7, 1992, 4-358093; Dec. 26, 1992, 4-362020; Feb. 15, 1993, 5-065874**

**Int. Cl.[6] C07D** *213/61;213/73*

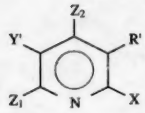
**U.S. Cl. 546—345** **10 Claims**

1. A method for halogenating pyridine, which comprises reacting a pyridine of the formula (I'):



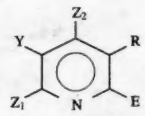
(I')

wherein X is amino; each of $Z_1$ and $Z_2$ is hydrogen or halogen; one of R and Y is hydrogen and the other is nitro, cyano or trifluoromethyl; with a halogenating agent to form a 3-halogenopyridine of the formula (II'):



(II')

wherein one of R' and Y' is halogen and the other is nitro, cyano, or trifluoromethyl; and X, $Z_1$ and $Z_2$ are as defined above,
wherein the pyridine of the formula (I') is reacted with a halogenating agent to form a halogenopyridine of the formula (III'):



(III')

wherein E is —N(A)—Hal, wherein A is hydrogen; and Hal is halogen; and $Z_1$, $Z_2$, R and Y are as defined above, and said halogenopyridine of the formula (III') is subjected to a rearrangement reaction in the presence of a proton donor to form the 3-halogenopyridine of the formula (II').

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**5,491,240**

## QUATERNARY COMPOUND OF A TERTIARY AMINE AND METHYL CHLORIDE

**Timothy C. Arnold, Janesville, Wis., and Robert E. Mehaffey, Jr., Easley, S.C., assignors to Witco Corporation, Greenwich, Conn.**

**Filed Sep. 29, 1994, Ser. No. 315,104**

**Int. Cl.[6] C07D** *233/14;233/24;* **C07C** *85/04;87/30*

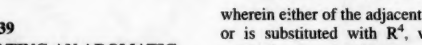
**U.S. Cl. 548—347.1** **7 Claims**

1. A process for forming a quaternary ammonium compound, comprising

(a) placing in a reaction vessel a molten amine which is a tertiary amine of the formula (1a)

$$(R^1)N(R^2)(R^3) \quad (1a)$$

or an imidazoline of the formula (1b)



(1b)

wherein either of the adjacent pair of carbon atoms is unsubstituted or is substituted with $R^4$, wherein $R^1$ is a lower alkyl group containing 1 to 6 carbon atoms, and $R^2$, $R^3$ and $R^4$ are the same or different and each has the formula $R^a—O—(CH_2)_b—$ or $R^a—$, wherein $R^a$ is a straight or branched alkyl or alkylene radical containing 12 to 24 carbon atoms and 0 to 3 carbon-carbon double bonds, and b is 1 to 4, which molten amine is free of solvent;

b) reducing pressure within said reaction vessel so that a vacuum is established over said molten amine, which is effective to purge said amine of gases;

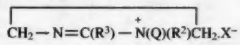
(c) completely quaternizing said molten amine by reacting it with a quaternizing agent consisting of one or more compounds of the formula QX, wherein Q is hydrogen, benzyl, methyl or ethyl and X is a monovalent anion, capable of quaternizing said amine such that the product formed by said reaction contains no unreacted quaternizing compounds, the combination of amine and quaternizing agent constituting a reaction mixture;

(d) adding solvent to said reaction mixture only if necessary to maintain said reaction mixture in a fluid state before the completion of said quaternization and then not before the viscosity of the reaction mixture is within 10% of no longer being fluid, and only in an amount sufficient to fluidize said reaction mixture and solubilize unreacted quaternizing agent but insufficient to cause a second phase to form in said reaction mixture; and

(e) recovering a product comprising high-purity quaternary ammonium compound of the formula (2a)

$(R^1)(Q)N(R^2)(R^3).X^-$ (2a)

or the formula (2b)


(2b)

wherein Q, $R^1$, $R^2$ and $R^3$ are as defined above and either of the adjacent pair of carbon atoms in formula (2b) is unsubstituted or is substituted with $R^4$ as defined above from said reaction vessel.

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**5,491,241**

**BICYCLIC INTERMEDIATES FOR EXCITATORY AMINO ACID RECEPTOR ANTAGONISTS**

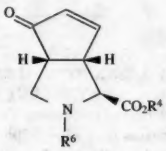
**James A. Monn, Indianapolis, Ind., assignor to Eli Lilly and Company, Indianapolis, Ind.**

**Filed Oct. 18, 1993, Ser. No. 138,664**

**Int. Cl.[6] C07D** *209/52*

**U.S. Cl. 548—452** **6 Claims**

1. A compound of the formula


VI

wherein:

$R^4$ is $C_1$–$C_6$ alkyl; $C_1$–$C_6$ alkyl substituted by one or more of hydroxy, fluoro, chloro, bromo and iodo; $C_3$–$C_7$ cyclic alkyl; or phenyl ($C_1$–$C_4$)alkyl in which the phenyl group is unsubstituted or is substituted with one or two moieties chosen from the group consisting of halogen, hydroxy, cyano, nitro, $C_1$–$C_6$ alkyl, $C_1$–$C_4$ alkoxy, ($C_1$–$C_6$ alkoxy)carbonyl, carboxymethyl, hydroxymethyl, amino, aminomethyl and trifluoromethyl; and

$R^6$ is formyl; ($C_1$–$C_6$ alkyl)carbonyl; ($C_1$–$C_6$ alkoxy) carbonyl; phenyloxycarbonyl in which the phenyl group is unsubstituted or substituted with one or two moieties chosen from the group consisting of halogen, hydroxy, cyano, nitro, $C_1$–$C_6$ alkyl, $C_1$–$C_4$ alkoxy, ($C_1$–$C_6$ alkoxy)carbonyl, carboxymethyl, hydroxymethyl, amino, aminomethyl and trifluoromethyl; or phenyl($C_1$–$C_6$ alkoxy)carbonyl in which the phenyl group is unsubstituted or substituted with one or two moieties chosen from the group consisting of halogen, hydroxy, cyano, nitro, $C_1$–$C_6$ alkyl, $C_1$–$C_4$ alkoxy, ($C_1$–$C_6$ alkoxy)carbonyl, carboxymethyl, hydroxymethyl, amino, aminomethyl and trifluoromethyl.

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**5,491,242**

**PROTEIN KINASE C INHIBITORS**

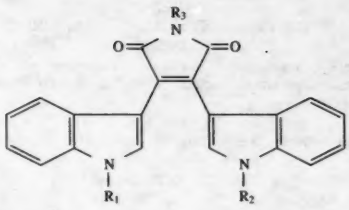
**James R. Gillig, and Michael R. Jirousek, both of Indianapolis, Ind., assignors to Eli Lilly and Company, Indianapolis, Ind.**

**Continuation-in-part of Ser. No. 263,912, Jun. 22, 1994. This application Mar. 15, 1995, Ser. No. 404,218**

**Int. Cl.[6] C07D** *403/14;* **A61K** *31/40*

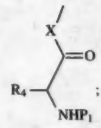
**U.S. Cl. 548—455** **28 Claims**

1. A compound of the formula:

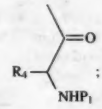


wherein:

$R_1$ is of the formula:



$R_2$ is acyl, alkoxyalkyl, hydroxyalkyl, aminoalkyl, monoalkylaminoalkyl, dialkylaminoalkyl, acylaminoalkyl, $N_3$ -alkyl, or an amino acid of the formula:



$R_3$ is H or $CH_3$;

$R_4$ is independently an amino acid side chain;

X is $—(CH_2)_n—NH—$, $—(CH_2)_n—O—$, phenylene—NH—, phenylene—O—, or a bond;

$P_1$ is independently H, alkyl, or an amino protecting group; and

n is independently 1, 2 or 3;

or a pharmaceutically acceptable salt or solvate thereof.

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**5,491,243**

**INTERMEDIATE USEFUL FOR THE ASYMMETRIC SYNTHESIS OF DULOXETINE**

**Richard A. Berglund, Lafayette, Ind., assignor to Eli Lilly and Company, Indianapolis, Ind.**

**Division of Ser. No. 135,032, Oct. 12, 1993, Pat. No. 5,362,886. This application Jul. 18, 1994, Ser. No. 276,233**

**Int. Cl.[6] C07D** *333/16*

**U.S. Cl. 549—75** **1 Claim**

1. (S)-(+)-N,N-dimethyl-3-(1-naphthalenyloxy)-3-(2-thienyl)propanamine, phosphoric acid salt.

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**5,491,244**

**ACRYLATE ESTER**

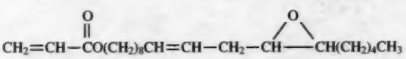
**Folahan O. Ayorinde, Upper Marlboro, and Mahmoud Hassan, Silver Spring, both of Md., assignors to Howard University, Washington, D.C.**

**Division of Ser. No. 250,213, May 27, 1994. This application Jun. 7, 1995, Ser. No. 476,983**

**Int. Cl.[6] C07D** *303/16*

**U.S. Cl. 549—561** **1 Claim**

1. A chemical compound of the formula:



## 5,491,245
## METHOD FOR THE SYNTHESIS OF AMPHOTERIC SURFACTANTS

**Burghard Grüning, and Christian Weitemeyer, both of Essen, Germany, assignors to Th. Goldschmidt AG, Essen, Germany**

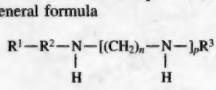
**Filed Mar. 15, 1994, Ser. No. 213,355**

**Claims priority, application Germany, Mar. 26, 1993, 43 09 900.9**

**Int. Cl.[6] C07C** *231/12*

**U.S. Cl. 554—68** **4 Claims**

**1**. A method for the synthesis of an amphoteric surfactant by reacting amines with chloroacetic acid or its salts in aqueous solution at an elevated temperature, comprising that compounds of the general formula



wherein

$R^1$ is a saturated or unsaturated alkyl group with 7 to 19 carbon atoms,

$R^2$ is a $-(CH_2)_q-$, $-O(CH_2)_q-$ or $-C{=}O$ group (q =1 to 3), is a hydrogen or $-CH_2H_2-OH$ group,

n has a numerical value of 2 or 3 and

p has a numerical value of 1 to 4,

are reacted with at least equimolar amounts of chloroacetic acid salts at a temperature ranging from about between 115° and 180° C., until the chloroacetic acid content is less than 10 ppm.

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## 5,491,246
## SYNTHESIS OF GROUP 4 METAL DIENE COMPLEXES

**Robert K. Rosen, Sugarland, Tex., and David D. Devore, Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.**

**Filed Apr. 24, 1995, Ser. No. 427,378**

**Int. Cl.[6] C07F** *17/00;7/00;7/28*

**U.S. Cl. 556—7** **4 Claims**

**1**. A process for preparing a Group 4 metal complex corresponding to the formula:

wherein:

M is titanium or zirconium in the +2 formal oxidation state;

L is a group containing a cyclic, delocalized, anionic, Π-system through which the group is bound to M;

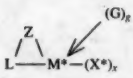
Z is a divalent moiety bound to both L and M comprising boron, or a member of Group 14 of the Periodic Table of the Elements, and also comprising nitrogen, phosphorus, sulfur or oxygen, said moiety having up to 60 non-hydrogen atoms; and

X is a neutral, conjugated or nonconjugated diene, optionally substituted with one or more hydrocarbyl groups, said X having up to 40 carbon atoms and forming a Π-complex with M;

the steps of the process comprising:

1)

a) contacting a conjugated or nonconjugated $C_{4-40}$ diene compound with a metal complex corresponding to the formula:



wherein,

M* is titanium or zirconium in the +or +4 formal oxidation state;

X* independently each occurrence is a $C_{1-20}$ hydrocarbyloxide;

x is one or two;

G is a neutral Lewis base selected from amines, phosphines and ethers said G having from 3 to 20 non-hydrogen atoms;

L and Z are as previously defined; and

g is a number from 0 to 3,

in an inert solvent, and

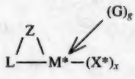
b) contacting the resulting mixture with a reducing agent,

or

2)

a) contacting a conjugated or nonconjugated $C_{4-40}$ diene compound with a reducing agent in a suitable noninterfering solvent, and

b) contacting the resulting mixture with a complex corresponding to the formula:



wherein,

L, Z, M*, X*, x, G and g are as previously defined.

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## 5,491,247
## PREPARATION OF A PRECIOUS METAL SALT OF A NONOXIDIZING ACID BY DIRECT REACTION

**Michael D. Gernon, Upper Providence, Pa., assignor to Elf Atochem North America, Inc., Philadelphia, Pa.**

**Filed Nov. 14, 1994, Ser. No. 338,069**

**Int. Cl.[6] C07F** *1/08;15/00*

**U.S. Cl. 556—113** **23 Claims**

**1**. A process for the direct synthesis of a precious metal salt of a nonoxidizing acid comprising reacting together a precious metal and an oxidizing agent in the presence of a substituted or unsubstituted $C_1$–$C_{40}$ alkanesulfonic acid.

**17**. A process for the direct synthesis of a silver salt of a linear $C_1$–$C_3$ alkanesulfonic acid comprising reacting together silver metal needles having a mesh size ranging from 8 to 100 with a linear $C_1$–$C_3$ alkanesulfonic acid at an acid to silver weight ratio ranging from about 2:1 to about 1:1, a temperature ranging from about 10° C. to about 80° C., a pressure ranging from about 0.1 to about 10 atmospheres, and for a time ranging from about 4 hours to about 48 hours, in the presence of hydrogen peroxide at a total peroxide to silver mole ratio ranging from about 6:1 to about 1/2:1.

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## 5,491,248
## READILY DISPERSIBLE BENTONITE

**Mitsuji Kondo, Kuroiso, and Takeo Sawada, Takasaki, both of, Japan, assignors to Hojun Kogyo Co., Ltd., Annaka, Japan**

**Filed Apr. 20, 1995, Ser. No. 425,534**

**Claims priority, application Japan, Feb. 1, 1995, 7-34692**

**Int. Cl.[6] C07F** *5/06*

**U.S. Cl. 556—173** **2 Claims**

**1**. Readily dispersible bentonite obtained by surface-treating bentonite with at least one alkyl-substituted silane compound represented by formula (I):

(I)

wherein R represents an alkyl group having 1 to 18 carbon atoms; X represents a methoxy group, an ethoxy group or a halogen atom; a and b each represents 1, 2 or 3, provided that (a+b) is 4;

in an amount of not more than 1% by weight based on the bentonite.

5,491,249

## PROCESS FOR PREPARING CYCLIC POLYSILOXANES FROM LINEAR POLYSILOXANES

John N. Kostas, Claymont, Del., assignor to Hercules Incorporated, Wilmington, Del.

Filed Apr. 20, 1995, Ser. No. 425,542

Int. Cl.[6] C07F 7/08

U.S. Cl. 556—460 37 Claims

1. A process for the production of cyclic polysiloxanes, comprising

(a) continuously passing a feed comprising linear polysiloxanes through a reactor containing a solid acid catalyst at a pressure greater than 14.7 psi absolute under an inert atmosphere, and

(b) recovering a mixture comprising volatile cyclic polysiloxanes, nonvolatile reaction products, and unreacted linear polysiloxanes.

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5,491,250

## PROCESS FOR PURIFYING VINYLICALLY UNSATURATED COMPOUNDS PREPARED USING A PALLADIUM-COMPLEX CATALYST

Edmund J. Stark, Midland; John A. Schultz, Auburn; Ernest L. Ecker, and Robert A. DeVries, both of Midland, all of Mich., assignors to The Dow Chemical Company, Midland, Mich.

Filed Mar. 23, 1995, Ser. No. 409,115

Int. Cl.[6] C07F 7/08

U.S. Cl. 556—466 20 Claims

1. In an improved process of reducing the concentration of palladium and halide in a crude vinylically unsaturated product that has been extracted with water from a product mixture containing the crude vinylically unsaturated product, the product mixture being formed from a palladium-complex-catalyzed reaction of a reactant halide selected from the group consisting of aryl, allyl, vinyl, and benzyl halides, and a reactant olefin having a vinylic hydrogen; wherein the reaction is carried out in the presence of a hydrogen halide acceptor; the improvement comprising the steps of:

a) contacting the crude vinylically unsaturated product with a base that is stronger than the hydrogen halide acceptor and phase-separable from the product;

b) phase-separating the product in step (a) from the stronger base; then

c) heating the separated product of step (b) under conditions such that the palladium can be isolated from the product by filtration or centrifugation; and

d) removing the palladium from the product in step (c).

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5,491,251

## 2-BENZOYL-3-AMINOACRYLATE DERIVATIVES AND METHODS FOR THE PREPARATION OF THE SAME

You Seung Kim; Soon Bang Kang, and Seon Hee Park, all of Seoul, Rep. of Korea, assignors to Korea Institute of Science and Technology, Seoul, Rep. of Korea

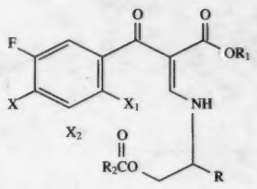
Filed Oct. 11, 1994, Ser. No. 321,370

Claims priority, application Rep. of Korea, Mar. 24, 1994, 1994/5974

Int. Cl.[6] C07C 205/06;229/30

U.S. Cl. 560—23 1 Claim

1. A 2-benzoyl-3-aminoacrylate derivative having the following formula I:



I

wherein

X is a halogen;

$X_1$ and $X_2$ are independently selected from a halogen and a nitro; and

R, $R_1$ and $R_2$ each is an alkyl group containing 1 to 4 carbon atoms.

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5,491,252

## POLYISOCYANATE COMPOSITIONS FOR THE PREPARATION OF FLEXIBLE POLYURETHANE FOAMS

Thirumurti Narayan, Grosse Ile; David J. Lovell, Woodhaven, both of Mich., and Carlos H. Lopez, Tlalnepantla, Mexico, assignors to BASF Corporation, Mt. Olive, N.J.

Division of Ser. No. 281,957, Jul. 28, 1994. This application Apr. 10, 1995, Ser. No. 419,162

Int. Cl.[6] C07C 261/00; C08G 18/10;18/12

U.S. Cl. 560—26 15 Claims

1. An isocyanate prepolymer composition, capable of reacting with a compound containing a least two isocyanate-reactive hydrogen atoms to form a foam, the composition comprising the result of combining:

(a.) about 50 to 90% by wt, based on the total isocyanate composition, of an isocyanate blend comprising:

(i) 55 to 75% by wt of 4,4'-diphenylmethane diisocyanate;

(ii) 17 to 27% by wt of 2,4'-diphenylmethane diisocyanate;

(iii) 1 to 10% by wt of 3-ring oligomers of

(iv) 1 to 15% by wt of n-ring oligomers of polymethylene polyphenyl polyisocyanate (n being greater than 3) the weights of (i) to (iv), being based on the weight of blend (a);

(b.) about 5 to 30% by wt, based on the total isocyanate composition, of a polyhydroxy containing polyol having a molecular weight of from 700 to about 6000; and

(c.) about 5 to 15% by wt, based on the total isocyanate composition, of toluene diisocyanate; and

wherein the resulting isocyanate prepolymer composition has a free NCO content of from about 20 to 40% by wt.

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5,491,253

## PROCESS FOR THE PREPARATION OF A SUBSTITUTED 2,5-DIAMINO-3-HYDROXYHEXANE

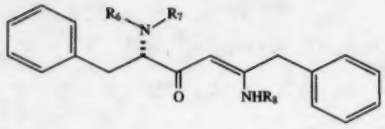
Timothy L. Stuk, Lindenhurst, Ill.; Michael S. Allen, Silver Lake, Wis.; Anthony R. Haight, Mundelein, Ill.; Francis A. Kerdesky, Grayslake, Ill.; Denton C. Langridge, Wildwood, Ill.; M. Robert Leanna, Grayslake, Ill.; Linda M. Lijewski, Milwaukee, Wis.; Laura Melcher, Deerfield, Ill.; Howard E. Morton, Gurnee, Ill.; Daniel W. Norbeck, Crystal Lake, Ill.; Daniel S. Reno, Kenosha, Wis.; Timothy A. Robbins, Gurnee, Ill.; David Scarpetti, Evanston, Ill.; Hing L. Sham, Mundelein, Ill.; Thomas J. Sowin, Grayslake, Ill.; Jien-Heh J. Tien, Libertyville, Ill., and Chen Zhao, Gurnee, Ill., assignors to Abbott Laboratories, Abbott Park, Ill.

Continuation-in-part of Ser. No. 141,795, Oct. 22, 1993, abandoned. This application Jul. 27, 1994, Ser. No. 281,502

Int. Cl.[6] C07C 261/00;233/00

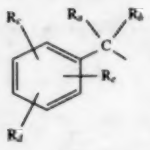
U.S. Cl. 560—27 4 Claims

1. A substantially pure compound of the formula:



wherein

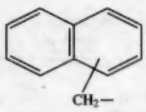
$R_6$ and $R_7$ are independently selected from



(i)

wherein

$R_a$ and $R_b$ are independently selected from hydrogen, loweralkyl and phenyl and $R_c$, $R_d$ and $R_e$ are independently selected from hydrogen, loweralkyl, trifluoromethyl, alkoxy, halo and phenyl; and



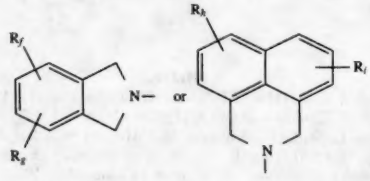
(ii)

wherein

the naphthyl ring is unsubstituted or substituted with one, two or three substitutents independently selected from loweralkyl, trifluoromethyl, alkoxy and halo; or

$R_6$ is as defined above and $R_7$ is $R_{7a}OC(O)$—wherein $R_{7a}$ is loweralkyl or benzyl; or

$R_6$ and $R_7$ taken together with the nitrogen atom to which they are bonded are



wherein

$R_f$, $R_g$, $R_h$ and $R_i$ are independently selected from hydrogen, loweralkyl, alkoxy, halogen and trifluoromethyl and $R_8$ is hydrogen or —C(O)R" wherein R" is loweralkyl, alkoxy, benzyloxy or phenyl wherein the phenyl ring is unsubstituted or substituted with one, two or three substituents independently selected from loweralkyl, trifluoromethyl, alkoxy and halo; or an acid addition salt thereof.

**5,491,254**

## PROSTAGLANDIN DERIVATIVES

**Fumie Sato, 1-219, Kugenumahigashi 3-Chome, Fujisawa-shi, Kanagawa 251; Takehiro Amano, Tokyo; Kazuya Kameo, Tokyo; Tohru Tanami, Tokyo; Masaru Mutoh, Tokyo; Naoya Ono, Tokyo, and Jun Goto, Tokyo, all of, Japan, assignors to Taisho Pharmaceutical Co., Ltd., and Fumie Sato, both of, Japan**

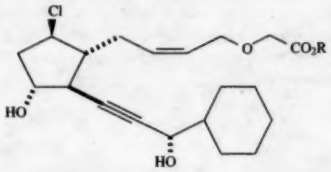
**Filed Jan. 19, 1995, Ser. No. 373,226**

**Claims priority, application Japan, Jul. 24, 1992, 4-198556**

**Int. Cl.[6] C07C** *177/00;* **A61K** *31/557*

**U.S. Cl. 560—121** **3 Claims**

**1**. A prostaglandin derivative represented by formula:



wherein R represents a hydrogen atom or an alkyl group having 1 to 6 carbon atoms, and a salt thereof.

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**5,491,255**

## PROCESS FOR THE TRANSESTERIFICATION OF DIMETHYL SUCCINYLSUCCINATE

**Franz T. Schwarz, Wolfern; Johann Altreiter, Neumarkt, and Franz Möstl, St. Veit, all of, Austria, assignors to Chemie Linz GmbH, Linz, Austria**

**Filed Oct. 18, 1994, Ser. No. 324,709**

**Claims priority, application Austria, Jan. 19, 1993, 2096/93**

**Int. Cl.[6] C07C** *69/74*

**U.S. Cl. 560—126** **5 Claims**

**1**. Process for the transesterification of dimethyl succinylsuccinate, characterized in that dimethyl succinylsuccinate is reacted with one or more aliphatic, straight-chain, branched or cyclic monoalcohols which are unsubstituted or substituted by phenyl groups and in each case have 2 to 22 C atoms, in the presence of an acidic catalyst and in the presence or absence of a diluent which is inert under the reaction conditions with exclusion of oxygen and under pressure, at least one of the two methoxy groups being replaced by the oxy group corresponding to the alcohol used.

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**5,491,256**

## COMPOSITION OF MATTER FOR ALIPHATIC-AROMATIC UREAS, BIURETS, AND ALLOPHANATES AS NITRIC OXIDE REDUCING AGENTS IN DIESEL EMISSIONS

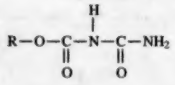
**Thomas F. Derosa, Passaic, N.J.; Rodney L. Sung, Fishkill, and Benjamin J. Kaufman, Hopewell Jct., both of N.Y., assignors to Texaco Inc., White Plains, N.Y.**

**Continuation of Ser. No. 976,634, Nov. 16, 1992, abandoned. This application Apr. 4, 1994, Ser. No. 222,509**

**Int. Cl.[6] C07C** *269/00*

**U.S. Cl. 560—132** **1 Claim**

**1**. A composition of matter comprising a substituted allophonate structurally represented by the formula:



where R is para-nonylphenyl.

5,491,257

## FLUORINE-CONTAINING AROMATIC COMPOUNDS

Norio Yoshino, Mitaka, Japan, assignor to Daikin Industries, Ltd., Osaka, Japan

Filed Mar. 15, 1994, Ser. No. 213,159
Claims priority, application Japan, Sep. 13, 1993, 5-252578
Int. Cl.[6] C07C 309/24
U.S. Cl. 562—41 7 Claims

1. A compound represented by the formula (III):

$$R_fC_6H_4COCHXR \quad \text{(III)}$$

wherein $R_f$ is a fluoroalkyl group having 1 to 20 carbon atoms; X is $SO_3M$; M is an alkali metal or $NH_4$; and R is an alkyl group having 1 to 20 carbon atoms.

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5,491,258

## MOLDED CATALYST OR SUPPORTED CATALYST FOR SYNTHESIZING METHACROLEIN AND METHACRYLIC ACID, A PROCESS FOR PRODUCTION THEREOF, AND A PROCESS OF USE THEREOF

Seigo Watanabe, and Motomu Ohkita, both of Otake, Japan, assignors to Mitsubishi Rayon Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 969,205, Feb. 8, 1993, abandoned.
This application Sep. 12, 1994, Ser. No. 302,979
Claims priority, application Japan, Jun. 6, 1991, 3-134946
Int. Cl.[6] C07C 51/21;45/32; B01J 23/881;33/00
U.S. Cl. 562—538 12 Claims

11. A process for synthesizing methacrolein and methacrylic acid that comprises packing a reactor with a molded, dried catalyst or a supported, dried catalyst which comprises at least molybdenum, bismuth and iron and in which the surface of at least a portion of the molded, dried catalyst or the supported, dried catalyst that has been coated with one or more highly depolymerizable organic high-molecular weight compounds in an amount of 0.1 to 40% by weight based on the weight of the catalyst; and subjecting isobutylene or tertiary butanol to vapor phase catalytic oxidation with molecular oxygen by the use of the catalyst which has been freed of the organic high-molecular weight compounds by depolymerization before the initiation of the reaction for synthesizing methacrolein and methacrylic acid.

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5,491,259

## PROCESS TO PRODUCE AMINOCARBOXYLIC ACIDS CONTAINING LOW RESIDUAL SALT

Jeffrey G. Grierson, Lake Jackson; Cameron T. Costain, Angleton, and David A. Wilson, Richwood, all of Tex., assignors to The Dow Chemical Company, Midland, Mich.

Filed Sep. 13, 1994, Ser. No. 305,111
Int. Cl.[6] C07C 229/00
U.S. Cl. 562—554 17 Claims

1. A method for producing an aqueous solution of an aminocarboxylic acid from an aqueous solution of an alkali metal salt of the aminocarboxylic acid, the method comprising:

adjusting the pH of the aqueous solution of the alkali metal salt of the aminocarboxylic acid to between about 1.0 and about 3.0 by adding a monovalent inorganic acid to the aqueous solution of the alkali metal salt of the aminocarboxylic acid to form an aqueous feed solution containing protonated aminocarboxylic acid and an inorganic alkali salt having an inorganic anion and an alkali metal cation; and

passing the aqueous feed solution through at least one membrane using a diafiltration process to separate the aqueous feed solution into an aqueous permeate solution containing the alkali metal cation and an aqueous retentate solution containing the aminocarboxylic acid.

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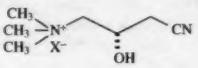
5,491,260

## PROCESS FOR MANUFACTURING L-(-)-CARNITINE FROM DERIVATIVES HAVING A CONFIGURATION OPPOSITE TO THAT OF L-(-)-CARNITINE

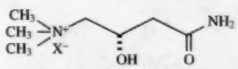
Fabio Giannessi, Rome; Roberto Castagnani, Recanati; Maria O. Tinti, Rome; Francesco De Angelis, Rome; Paolo De Witt, Rome, and Domenico Misiti, Rome, all of, Italy, assignors to Sigma-Tau Industrie Farmaceutiche Riunite S.p.A., Rome, Italy

Filed Apr. 7, 1994, Ser. No. 224,522
Claims priority, application Italy, Apr. 8, 1993, RM93A0226
Int. Cl.[6] C07C 227/18;253/34; C07D 305/12
U.S. Cl. 562—567 19 Claims

1. A process for producing L-(−)-carnitine from D-(+)-carnitinenitrile 1 and D-(+)-carnitineamide 1' having the formulas 1 and 1'



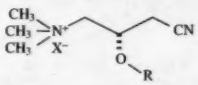
1



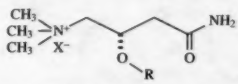
1'

wherein $X^-$ is a counterion, which comprises:

(a) converting 1 or 1' to acyl D-(+)-carnitinenitrile 2 or acyl D-(+)-carnitineamide 3 having the formulas



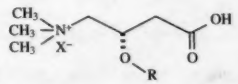
2



3

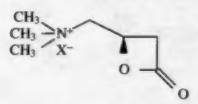
wherein R is selected from the group consisting of $C_1$–$C_{12}$ alkylsulfonyl, formyl, trifluoroacetyl, p-toluenesulfonyl, p-bromobenzenesulfonyl, trifluoromethanesulfonyl, nonafluorobutanesulfonyl, 2,2,2-trifluoroethanesulfonyl, and p-nitrobenzenesulfonyl radicals;

(b) converting the acyl D-(+)-carnitinenitrile 2 or the acyl D-(+)-carnitineamide 3 via acid hydrolysis to acyl D-(+)-carnitine 4 of the formula



4

(c) lactonizing the acyl D-(+)-carnitine 4 to the lactone of L-(−)-carnitine 5 of the formula



5

by treating 4 with base; and

(d) converting the lactone 5 to L-(−)-carnitine by treating 5 with base.

## 5,491,261

## POLY-PERFLUOROALKYL-SUBSTITUTED ALCOHOLS AND ACIDS, AND DERIVATIVES THEREOF

**Marion Haniff, West Orange, N.J.; Robert Falk, New City, N.Y.; Ted Deisenroth, Carmel, N.Y., and Karl F. Mueller, New York, N.Y., assignors to Ciba-Geigy Corporation, Tarrytown, N.Y.**

**Filed Jul. 1, 1994, Ser. No. 270,083**

**Int. Cl.**[6] **C07C** *43/15;43/17;43/10;43/12;53/126;53/02;55/22;55/32*

**U.S. Cl. 562—582** **18 Claims**

**1**. An oligo-perfluoroalkyl alcohol or acid of the formula I or II

$$(Q_F—CH_2O)_b—Y—(X)_a \quad (I)$$

or

$$Z_e(—L—(U—OH)_d)_c \quad (II)$$

wherein

$Q_F$ is $Q_{F1}$ or $Q_{F2}$, in which $Q_{F1}$ is $R_FCH_2CHI—$ and $Q_{F2}$ is $R_FCH{=}CH—$, and

$R_F$ is a monovalent, perfluorinated, alkyl or alkenyl, straight, branched or cyclic organic radical having three to twenty fully fluorinated carbon atoms, which radical can be interrupted by divalent oxygen or sulfur atoms, with each $R_F$ radical being identical or different from the other $R_F$ radicals,

Y is a trivalent or tetravalent organic linking group with from 1 to 20 carbon atoms, which can be interrupted by one or more polyvalent groups or hetero atoms selected from —O—, —S—, —N<,—$NR_1$—,—CO—,—$CONR_1$—, —NHCOO—,—CON<, —$CO_2$—, —$O_2C$—, —$O_2CO$— and —$SO_2$—, in which

$R_1$ is hydrogen, $C_1$–$C_{20}$alkyl, di-$C_1$–$C_2$alkylamino-$C_2$–$C_6$alkylene, hydroxy-$C_1$–$C_5$alkylene, or $C_1$–$C_5$alkyl or hydroxy-$C_1$–$C_5$alkylene, which is substituted by pyridyl, piperidyl or cyclohexyl.

X is OH, O—$CH_2$—COOH or COOH,

a is 1 or 2,

b is 2or 3,

L is O, S or NR', in which

R' is $C_1$ –$C_{20}$hydrocarbyl, hydroxy-$C_2$–$C_5$alkylene, carboxymethylene or U—OH,

U is $CH_2—CH(—O—CH_2—CH(R_F)—)_r—(O—CH_2—CH(CH_2OCH{=}CH_2)—)_q$

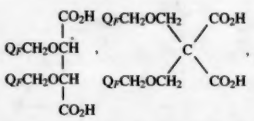
Z is H or a mono-, di-, tri- or tetravalent organic group of 1–40 carbon atoms which can be interrupted by one or more polyvalent groups or hetero atoms selected from —O—, —S—, —N<, —$NR_1$—, —CO—, —$CONR_1$—, —NHCOO—, —CON<, —$CO_2$—, —$O_2C$—, —$O_2CO$— and —$SO_2$—, and can also be substituted by hydroxyl, carboxyl, carboxyalkyl or sulfonate when L is S or NR', r and q are each, independently, 0 to 10,

c is 1 to4,

d is 1 to 3, with the proviso that when c and d are both 1, Z is monovalent and r is >0, and

e is 0 or 1, with the proviso that when e is 0, d is 2 and L is S or NR'.

**6**. An acid of the formula I according to claim **1**, which is selected from the group consisting of



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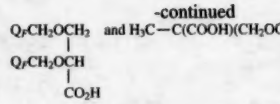


## 5,491,262

## BIS{[1-(2-A-2-B)ETHENYL]}[2-$R^2$-4-X-PHENYL-OR 1-(2-$R^2$-4-X-PHENYL)ETHENYL]METHANES

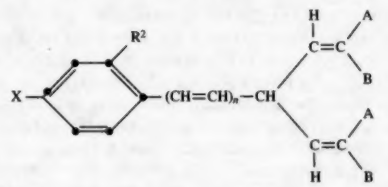
**William M. Hung, Alpharetta, Ga., assignor to Hilton Davis Chemical co., Cincinnatti, Ohio**

**Division of Ser. No. 167,223, Mar. 11, 1988, Pat. No. 4,870,050. This application Jul. 28, 1989, Ser. No. 387,547**

**Int. Cl.**[6] **C07C** *211/45;211/54;* **C07D** *209/14*

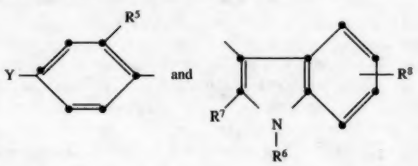
**U.S. Cl. 564—330** **9 Claims**

**1**. A bis [1-(2-A-2-B)ethenyl][2-$R^2$-4-X-phenyl or 1-(2-$R^2$-4-X-phenyl)-2-ethenyl] methane having the formula

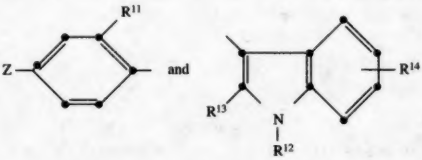


wherein:

A represents a moiety selected from the group consisting of



B represents a moiety selected from the group consisting of



in which X represents hydrogen, —N(R)($R^1$), a pyrrolidinyl or piperidinyl; Y represent hydrogen or —N($R^3$) ($R^4$); Z represents hydrogen or —N($R^9$) ($R^{10}$) wherein R, $R^3$ and $R^9$ independently represent hydrogen; non-tertiary $C_1$ to $C_8$ alkyl; benzyl; or benzyl substituted in the benzene ring by one or two of non-tertiary $C_1$ to $C_4$ alkyl, non-tertiary $C_1$ to $C_4$ alkoxy, nitro or halo; $R^1$, $R^4$ and $R^{10}$ independently represent non-tertiary $C_1$ to $C_8$ alkyl; phenyl; phenyl substituted with one or two of non-tertiary $C_1$ to $C_4$ alkyl, non-tertiary $C_1$ to $C_4$ alkoxy, nitro or halo; benzyl; or benzyl substituted in the benzene ring by one or two of non-tertiary $C_1$ to $C_4$ alkyl, non-tertiary $C_1$ to $C_4$ alkoxy, nitro or halo; $R^2$, $R^5$ and $R^{11}$ independently represent hydrogen, non-tertiary $C_1$ to $C_4$ alkyl, non-tertiary $C_1$ to $C_4$ alkoxy or halo; $R^6$ and $R^{12}$ independently represent hydrogen; non-tertiary $C_1$ to $C_{16}$ alkyl substituted by non-tertiary $C_1$ to $C_8$ alkoxy, phenoxy, phenyl or phenyl substituted by one or two of non-tertiary $C_1$ to $C_4$ alkyl, non-tertiary $C_1$ to $C_4$ alkoxy, nitro or halo; $R^7$ and $R^{13}$ independently represent hydrogen, non-tertiary $C_1$ to $C_4$ alkyl or phenyl; $R^8$ and $R^{14}$ indepen-

dently represent one or two of hydrogen, non-tertiary $C_1$ to $C_4$ alkyl, non-tertiary $C_1$ to $C_4$ alkoxy, nitro or halo; and n represents zero or one with the proviso that only one of X, Y and Z can be hydrogen at the same time.

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**5,491,263**

## AMINOETHYLATION PROCESS FOR PRODUCTION OF SUBSTITUTED ETHYLENE DIAMINES

**Peter C. Rooney, and Michael O. Nutt, both of Lake Jackson, Tex., assignors to The Dow Chemical Company, Midland, Mich.**

**Filed Dec. 21, 1993, Ser. No. 171,039**
**Int. Cl.[6] C07C** *211/10*
**U.S. Cl. 564—369** **11 Claims**

1. A process for preparing a 1,2-ethanediamine in a ring opening reaction of an oxazolidinone, the process comprising

contacting an oxazolidinone with an aliphatic secondary amine or an aliphatic secondary alkanolamine to effect reaction of the oxazolidinone with the aliphatic secondary amine or aliphatic secondary alkanolamine for a sufficient time to form a 1,2-ethanediamine.

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**5,491,264**

## PREPARATION OF ISOPHORONE DIAMINE

**Frank E. Herkes, Wilmington, and Kostantinos Kourtakis, Hockessin, both of Del., assignors to E. I. du Pont de Nemours and Company, Wilmington, Del.**

**Continuation-in-part of Ser. No. 94,361, Jul. 27, 1993, abandoned. This application Sep. 12, 1994, Ser. No. 304,072**
**Int. Cl.[6] C07C** *209/24;209/48;209/52*
**U.S. Cl. 558—431** **3 Claims**

1. A continuous process for the preparation of 3-cyano-3,5,5-trimethylcyclohexaneimine which comprises the treatment of 3-cyano-3,5,5-trimethylcyclohexanone (IPN) with ammonia in a molar ratio of 6–100 moles of ammonia per mole of IPN, at a temperature in the range of 50° to 90° C. and at a pressure in the range of 500 to 3500 psig, in the presence of 0.2–3 grams of a heteropoly acid catalyst supported on a refractory oxide or carbon per gram of IPN plus ammonia, wherein the catalyst remains on the support throughout the process.

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**5,491,265**

## PROCESS FOR PREPARING 6-CHLORO-2-HEXANONE FROM 1-METHYLCYCLOPENTANE

**Diane E. Allen; Charles E. Tucker; Charles C. Hobbs, and Ramakrishnan Chidambaram, all of Corpus Christi, Tex., assignors to Hoechst Celanese Corporation, Somerville, N.J.**

**Filed Feb. 28, 1995, Ser. No. 395,266**
**Int. Cl.[6] C07C** *45/51*
**U.S. Cl. 568—347** **28 Claims**

1. A process for preparing 6-chloro-2-hexanone which comprises the steps of (a) oxidizing methylcyclopentane with ozone in the presence of a carboxylic acid and for a sufficient period of time to form 1-methylcyclopentanol; (b) reacting said 1-methylcyclopentanol with a suitable amount of an alkali metal hypochlorite in the presence of a carboxylic acid to form 1-methylcyclopentyl hypochlorite; and (c) heating said 1-methylcyclopentyl hypochlorite for a sufficient period of time to form 6-chloro-2-hexanone.

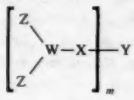
**5,491,266**

## ASYMMETRIC SYNTHESES

**James E. Babin, Hurricane, and Gregory T. Whiteker, Charleston, both of W. Va., assignors to Union Carbide Chemicals & Plastics Technology Corporation, Danbury, Conn.**

**Division of Ser. No. 911,518, Jul. 16, 1992, Pat. No. 5,360,938, which is a continuation-in-part of Ser. No. 748,112, Aug. 21, 1991, abandoned, and a continuation-in-part of Ser. No. 748,111, Aug. 21, 1991, abandoned. This application Jun. 20, 1994, Ser. No. 262,508**
**Int. Cl.[6] C07C** *45/00;41/00*
**U.S. Cl. 568—449** **58 Claims**

1. A process which comprises reacting a prochiral or chiral compound in the presence of an optically active metal-ligand complex catalyst to produce an optically active product, said optically active metal-ligand complex catalyst comprising a metal complexed with an optically active ligand having the formula




wherein each W is the same or different and is phosphorus, arsenic or antimony, each X is the same or different and is oxygen, nitrogen or a covalent bond linking W and Y, Y is a substituted or unsubstituted hydrocarbon residue, each Z is the same or different and is a substituted or unsubstituted hydrocarbon residue or the Z substituents bonded to W may be bridged together to form a substituted or unsubstituted cyclic hydrocarbon residue, and m is a value equal to the free valence of Y, provided at least one of Y and Z is optically active and provided said process is other than hydroformylation and hydrogenation.

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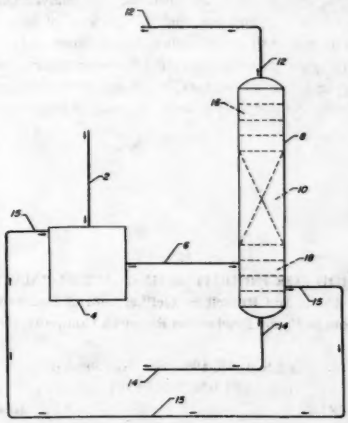
**5,491,267**

## ETHERIFICATION PROCESS USING POST SEPARATION RECYCLE

**Stanley J. Frey; David W. Liu, both of Palatine; Charles P. Luebke, Mount Prospect, and Terry L. Marker, Palatine, all of Ill., assignors to UOP, Des Plaines, Ill.**

**Continuation-in-part of Ser. No. 10,896, Jan. 29, 1993, abandoned. This application Mar. 7, 1994, Ser. No. 207,525**
**Int. Cl.[6] C07C** *43/02*
**U.S. Cl. 568—647** **2 Claims**




1. A process for the production of tertiary amyl methyl ether (TAME) by etherification which comprises the steps:

(a) passing a feed stream, comprising methanol, isopentane and isopentene, and a recycle stream into an etherification reaction

zone and producing a reaction zone effluent stream comprising TAME, isopentane, isopentene and methanol;

(b) passing the reaction zone effluent stream into a catalytic distillation column having top and bottom fractionation zones and a middle zone of etherification catalyst at a point below the etherification catalyst;

(c) recovering a net overhead stream comprising isopentane from overhead vapors removed from the catalytic distillation column;

(d) recovering a net bottoms stream comprising TAME from bottoms liquid removed from the catalytic distillation column;

(e) withdrawing a sidecut stream from the catalytic distillation column at a point within the catalytic distillation column below the point at which the reaction zone effluent stream enters the catalytic distillation column, with the sidecut stream comprising essentially isopentene and TAME, having an isopentene concentration of from about 5–20 mole % and having a higher molar ratio of isopentene to TAME than the reaction zone effluent stream, and passing the sidecut stream into the etherification reaction zone as the previously referred to recycle stream.

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**5,491,268**

**PROCESS FOR REMOVAL OF ACIDIC COMPOUNDS FROM PHENOL PROCESS STREAMS**

**Michael J. Cipullo, Prattville, Ala., assignor to General Electric Company, Pittsfield, Mass.**

**Filed Sep. 23, 1994, Ser. No. 311,335**

**Int. Cl.[6] C07C** *37/70*

**U.S. Cl. 568—758** **16 Claims**

1. A process for the purification of a phenolic compound comprising:

a) preparing a phenolic compound by a process selected from the group consisting of decomposition of cumene hydroperoxide, the decomposition of benzoic acid, the de-sulfonation of benzene sulfonic acid, the hydrolysis of chlorobenzene, the catalytic hydrolysis of chlorobenzene, the catalytic dehydrogenation of cyclohexanol, and the cracking of by-products from the manufacture of bisphenol compounds, and

b) purifying the phenolic compound by contacting the phenolic compound with an inorganic oxide adsorbent selected from the group consisting of alumina, titania, and magnesia.

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**5,491,269**

**METHOD FOR INHIBITING HYDRATE FORMATION**

**Karla S. Colle, and Russell H. Oelfke, both of Houston, Tex., assignors to Exxon Production Research Company, Houston, Tex.**

**Filed Sep. 15, 1994, Ser. No. 306,331**

**Int. Cl.[6] C07C** *7/20;* **F17D** *1/05*

**U.S. Cl. 585—15** **10 Claims**

1. A method for inhibiting the formation of clathrate hydrates in a fluid having hydrate forming constituents, said method comprising treating said fluid with an inhibitor comprising a substantially water soluble polymer produced from a cyclic imino ether.

**5,491,270**

**BENZENE REDUCTION IN GASOLINE BY ALKYLATION WITH HIGHER OLEFINS**

**Arthur A. Chin, Cherry Hill; Nick A. Collins, Medford, both of N.J.; Mohsen N. Harandi, Langhorne, Pa.; Robert T. Thomson, Lawrenceville, N.J., and Robert A. Ware, Wyndmoor, Pa., assignors to Mobil Oil Corporation, Fairfax, Va.**

**Continuation of Ser. No. 28,058, Mar. 8, 1993, abandoned. This application Jul. 22, 1994, Ser. No. 278,713**

**Int. Cl.[6] C07C** *2/66*

**U.S. Cl. 585—467** **23 Claims**

1. A process for alkylating a benzene-rich gasoline boiling range hydrocarbon feedstream with a hydrocarbon stream comprising $C_5$+ olefins to produce product gasoline having a reduced benzene content and containing aromatics comprising substantially entirely $C_{10}$− alkylated aromatics, said process comprising:

contacting said benzene-rich stream and said $C_5$+ olefin stream in a fluidized bed with solid, shape selective aluminosilicate catalyst particles in a catalyst bed under benzene alkylation conditions whereby an effluent stream is produced comprising said gasoline having a reduced benzene content and in which the aromatics which are present are substantially entirely $C_{10}$− alkylated aromatics.

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**5,491,271**

**DETERGENT ALKYLATION USING A REGENERABLE CLAY CATALYST**

**Richard E. Marinangeli, Arlington Heights, and Jennifer S. Holmgren, Bloomingdale, both of Ill., assignors to UOP, Des Plaines, Ill.**

**Filed Aug. 26, 1994, Ser. No. 296,391**

**Int. Cl.[6] C07C** *2/66*

**U.S. Cl. 585—468** **14 Claims**

1. A process for the alkylation of benzene comprising:

a) reacting under alkylating conditions benzene with one or more linear monoolefins in a feedstock containing at least one linear monoolefin, said alkylating conditions including reacting from about 5 to about 30 molar proportions of total benzene for each molar proportion of total linear monoolefins at a temperature from about 80° C. to about 150° C. and a pressure from about 200 to about 1000 psig, in the presence of a tetrahedrally charged clay as catalyst to obtain alkylated benzenes with an initial conversion of at least 98% of said monoolefins;

b) continuing reacting benzene and said monoolefins under alkylating conditions until, as a consequence of catalyst deactivation, conversion of said monoolefins decreases to no less than about 80% conversion;

c) reactivating the deactivated catalyst by heating the catalyst with from about 10 to about 75 volumes of benzene at a temperature from about 100° to about 250° C. for a time sufficient to afford a reactivated catalyst whose activity is sufficient to effect at least 98% conversion of said monoolefins in their reaction with benzene; and

d) repeating stage a).

5,491,272

## METHOD FOR OLIGOMERIZING AN ALPHA-OLEFIN

Eiji Tanaka, Kurashiki; Hisao Urata, Tokyo, and Toshiyuki Oshiki, Yokohama, all of, Japan, assignors to Mitsubishi Chemical Corporation, Tokyo, Japan

Filed Sep. 17, 1993, Ser. No. 121,864

Claims priority, application Japan, Sep. 17, 1992, 4-247811; Nov. 24, 1992, 4-313646; Nov. 24, 1992, 4-313647; Nov. 25, 1992, 4-315247

Int. Cl.[6] C07C *2/02*

U.S. Cl. 585—520 33 Claims

1. A method for oligomerizing an α-olefin in the presence of a catalyst comprising a chromium compound having at least one chromium-pyrrolyl bond and an alkylaluminum compound, comprising the steps of:

(a) contacting the α-olefin with the chromium compound and the alkylaluminum compound simultaneously without preliminarily contacting the chromium compound with either the α-olefin or the alkylaluminum compound,

(b) oligomerizing the α-olefin at a temperature of from 0° to 250° C. under a pressure from atmospheric pressure to 250 $kg/cm^2$, and the concentration of the chromium compound is from 0.1 mg to 5 g per liter of solvent, and the alkylaluminum compound is in an amount of at least 5 mmol per gram of the chromium compound.

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5,491,273

## CATALYTIC CONVERSION OF METHANOL TO LINEAR OLEFINS

Jose G. Santiesteban, Yardley, Pa.; Clarence D. Chang, Princeton, N.J.; James C. Vartuli, West Chester, Pa., and David H. Olson, Pennington, N.J., assignors to Mobil Oil Corporation, Fairfax, Va.

Filed Nov. 17, 1994, Ser. No. 340,787

Int. Cl.[6] C07C *1/00*

U.S. Cl. 585—639 9 Claims

1. A process for converting a feed comprising at least one lower aliphatic alcohol having from 1 to 3 carbon atoms or a corresponding ether of such an alcohol to hydrocarbon products comprising linear olefins, the process comprising contacting the feed in a reaction zone with a catalyst comprising material having a large crystal ferrierite aluminosilicate structure, the aluminosilicate catalyst comprising a hydrogenation component, the hydrogenation component comprising combinations of Group VIA and VIIIA metals, wherein the average crystal size is larger than 0.5 microns and is selected from the group consisting of ZSM-35,FU-9,ISI-6,NU-23and SR-D, withdrawing from the reaction zone an effluent comprising linear olefins, and separating the linear olefins from the effluent.

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5,491,274

## PROCESS AND DEVICE FOR CATALYTIC DEHYDROGENATION OF A $C_{2+}$ PARAFFINIC CHARGE COMPRISING A SELF-COOLING SYSTEM

Ari Minkkinen, Saint Nom la Breteche, and Jean-Pierre Burzynski, Sainte-Foy-les Lyon, both of, France, assignors to Institut Francais du Petrole, Rueil Malmaison, France

Filed Nov. 8, 1993, Ser. No. 148,267

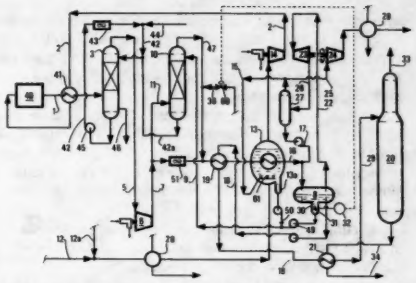
Claims priority, application France, Nov. 6, 1992, 92 13515

Int. Cl.[6] C07C *5/333*

U.S. Cl. 585—655 12 Claims

1. A process for catalytic dehydrogenation of a $C_{2+}$ paraffinic hydrocarbon charge comprising:

a) dehydrogenating in a catalytic dehydrogenating zone under dehydrogenation conditions said charge in the gas phase in the presence of hydrogen to provide a dehydrogenation effluent comprising water, hydrogen, at least one olefinic hydrocarbon and at least one unconverted paraffinic hydrocarbon,



b) one or more steps of cooling the dehydrogenation effluent in an indirect cooling zone with said charge before it is introduced into the dehydrogenation zone,

c) compressing the thus-cooled effluent,

d) eliminating water from the compressed effluent,

e) cooling the compressed effluent in a dual-chamber heat exchanger,

f) separating the thus-cooled effluent into a hydrogen-rich vapor phase and a hydrocarbon liquid phase comprising at least one olefinic hydrocarbon and unconverted hydrocarbons, and

g) isentropically expanding the hydrogen-rich vapor phase to separate a hydrocarbon residual condensate, which is mixed with the cooled effluent from the dual-chamber heat exchanger, and hydrogen, at least a part of which is directly recycled to a first chamber of said dual-chamber heat exchanger and, therein, contacting said hydrogen with the charge in the liquid phase in said first chamber,

wherein, for the cooling in the dual-chamber heat exchanger, the charge in the liquid phase, before being introduced to the dehydrogenation zone, is introduced into a first chamber of said dual-chamber heat exchanger, said first chamber being of sufficient volume to allow vaporization of the charge therein, and the compressed effluent is introduced into a second chamber of said dual-chamber heat exchanger such that the charge is evaporated and recovered from the first chamber and passed to the dehydrogenation zone, and the compressed effluent is cooled by indirect heat exchange.

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5,491,275

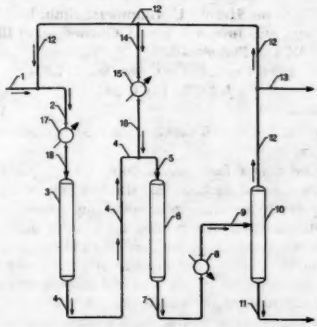
## PROCESS FOR THE DEHYDROGENATION OF PARAFFINIC HYDROCARBONS

Bipin V. Vora, Darien, and Tamotsu Imai, Mount Prospect, both of Ill., assignors to UOP, Des Plains, Ill.

Continuation-in-part of Ser. No. 51,926, Apr. 26, 1993, abandoned. This application Sep. 1, 1994, Ser. No. 299,874

Int. Cl.[6] C07C *5/32;5/333*

U.S. Cl. 585—659 8 Claims



1. A process for the dehydrogenation of a paraffinic dehydrogenatable hydrocarbon which process comprises:

(a) contacting said paraffinic dehydrogenatable hydrocarbon and hydrogen with a dehydrogenation catalyst at dehydrogenation conditions in a first dehydrogenation zone wherein the endothermic dehydrogenation reaction reduces the temperature of a resulting hydrocarbon stream containing dehydrogenated hydrocarbon compounds;

(b) contacting said hydrocarbon stream containing dehydrogenated hydrocarbon compounds produced in step (a) with a first hydrogen-rich gaseous stream having a temperature greater than said hydrocarbon stream to thereby increase the temperature of said hydrocarbon stream to dehydrogenation conditions;

(c) contacting a resulting heated hydrocarbon stream produced in step (b) with a dehydrogenation catalyst at dehydrogenation conditions in a second dehydrogenation zone;

(d) condensing at least a portion of an effluent from said second dehydrogenation zone to produce a liquid hydrocarbon stream comprising dehydrogenated hydrocarbon compounds and a second hydrogen-rich gaseous stream;

(e) heating at least a portion of said second hydrogen-rich gaseous stream to produce said first hydrogen-rich gaseous stream of step (b); and

(f) recovering dehydrogenated hydrocarbon compounds.

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**5,491,276**

## SKELETAL ISOMERIZATION OF N-BUTYLENES TO ISOBUTYLENE ON ZEOLITES

**Chi-Lin O'Young, Poughkeepsie; Regis J. Pellet, Croton-On-Hudson; Alison E. Hadowanetz, Maybrook; John Hazen, Cragsmoor, and James E. Browne, Beacon, all of N.Y., assignors to Texaco Inc., White Plains, N.Y.**

**Continuation of Ser. No. 990,407, Dec. 12, 1992, abandoned.**
**This application Feb. 25, 1994, Ser. No. 202,866**
**The portion of the term of this patent subsequent to Oct. 31, 2012, has been disclaimed.**
**Int. Cl.[6] C07C** *5/27*
**U.S. Cl. 585—671** **8 Claims**

1. A method of converting n-butylenes to isobutylene by a skeletal isomerization reaction wherein said reaction is carried out at a temperature of between 300° C. and 650° C., under a pressure of between 0.1 and 100 atmospheres and a space velocity of said n-butylenes of between 0.1 and 40 Weight Hourly Space Velocity (WHSV) using a catalyst consisting essentially of a zeolite having a pore size of at least about 4.5 angstroms and the pore size structure is characterized by intersecting 10-member ring and 8-member ring channels.

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**5,491,277**

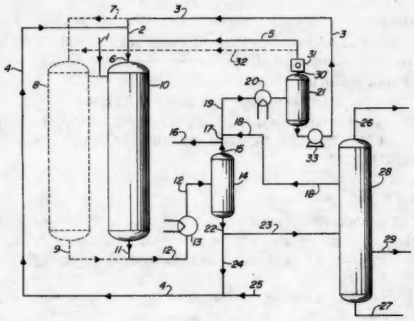
## MIXED-PHASE SOLID BED HYDROCARBON ALKYLATION PROCESS

**Laurence O. Stine; Harold U. Hammershaimb, both of Western Springs, and Joseph A. Kocal, Gurnee, all of Ill., assignors to UOP, Des Plaines, Ill.**

**Filed Dec. 28, 1993, Ser. No. 174,494**
**Int. Cl.[6] C07C** *2/62*
**U.S. Cl. 585—719** **13 Claims**

1. A process for the alkylation of a feed hydrocarbon which comprises the steps:

(a) passing a first feed stream comprising a paraffinic feed hydrocarbon and a second feed stream comprising an alkylating agent into a reaction zone containing a fixed bed of solid alkylation catalyst and operated at alkylation-promoting conditions which include an inlet pressure and temperature which result in mixed-phase conditions at which at least a portion of the alkylating agent and the feed hydrocarbon are present as a vapor and reacting the feed hydrocarbon and the alkylating agent to produce a product hydrocarbon in an exothermic reaction which causes the vaporization of liquid phase hydrocarbons present in the reaction zone;



(b) passing a mixed-phase effluent stream comprising said feed hydrocarbon and said product hydrocarbon, and which is withdrawn from the reaction zone, into a separation zone in which the effluent stream is separated into a liquid phase process stream, which comprises the product hydrocarbon, and a vapor phase process stream, which comprises the feed hydrocarbon;

(c) passing a first portion of the liquid phase process stream into a product recovery zone, and recovering the product hydrocarbon;

(d) recovering at least a portion of the feed hydrocarbon from the vapor phase process stream and passing the thus recovered feed hydrocarbon into the reaction zone.

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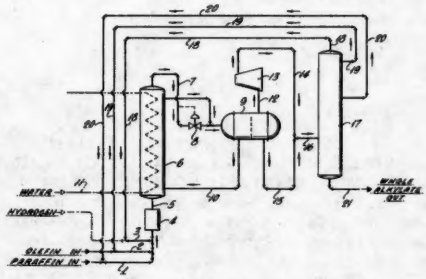
**5,491,278**

## ALKYLATION PROCESS USING SOLID SUPERACID CATALYST LIQUID PHASE

**Howard P. Angstadt, Media, Pa.; Elmer J. Hollstein, Wilmington, Del., and Chao-Yang Hsu, Media, Pa., assignors to Sun Company, Inc. (R&M), Philadelphia, Pa.**

**Filed Nov. 12, 1993, Ser. No. 151,718**
**Int. Cl.[6] C07C** *2/62*
**U.S. Cl. 585—731** **12 Claims**



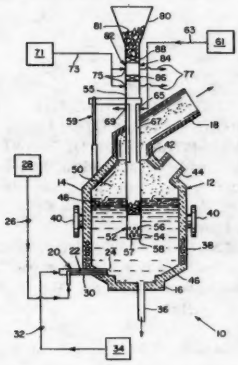

1. Method of alkylating isoparaffins and olefins which comprises contacting a feedstock comprising isoparaffins and olefins with a solid superacid catalyst containing heteropolyacid or polyoxoanion under conditions to maintain said feedstock in liquid phase, said conditions including a temperature in the range from about −40° C. to about 200° C. and a pressure in the range from about 1 atmosphere to about 200 atmospheres.

5,491,279

## METHOD FOR TOP-CHARGING SOLID WASTE INTO A MOLTEN METAL BATH

Edgar J. Robert, Glenshaw, Pa.; F. James Howie, III, Boxborough, Mass.; Christopher J. Nagel, Wayland, Mass., and Thomas P. Griffin, Norton, Mass., assignors to Molten Metal Technology, Inc., Waltham, Mass.

Filed Apr. 2, 1993, Ser. No. 42,609
Int. Cl.[6] A62D *3/00*
U.S. Cl. 588—201 10 Claims



1. A method for top-charging a solid waste into a molten metal bath contained in a reactor, wherein the solid waste is dissociated into dissociation products that are subsequently oxidized to form a gaseous oxygenated product, comprising introducing said waste into the reactor through a refractory tube that extends within the reactor and into the molten metal bath, said refractory tube having a submergible end that is immersed in the molten metal bath and that has a lower opening at a terminal portion of the submergible end and at least one elevated opening, whereby a portion of the molten metal bath enters the refractory tube through the lower opening for dissociating the waste and for forming the gaseous oxygenated product, the gaseous oxygenated product passing out of the refractory tube through said elevated opening and being discharged from the reactor through a reactor outlet disposed above the molten metal bath.

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5,491,280

## INJECTOR NOZZLE FOR MOLTEN SALT DESTRUCTION OF ENERGETIC WASTE MATERIALS

William A. Brummond, Livermore, and Ravindra S. Upadhye, Pleasanton, both of Calif., assignors to Regents of the University of California, Oakland, Calif.

Filed Jun. 29, 1993, Ser. No. 84,633
Int. Cl.[6] C06B *21/00*
U.S. Cl. 588—202 8 Claims

1. A method for safely injecting an energetic material into a reactor containing a molten salt bath for destruction of the energetic material, comprising:

(a) mixing the energetic material and a diluent to form a fuel mixture;

(b) adding a carrier gas to the fuel mixture;

(c) forming droplets of the carrier gas and fuel mixture;

(d) cooling the droplets;

(e) maintaining the temperature of the droplets below the decomposition temperature of the fuel mixture; and

(f) injecting the droplets into the molten salt bath.

5,491,281

## REACTIVE EXOTHERMIC LIQUID - INORGANIC SOLID HYBRID PROCESS

Vasanth Bhat, Cincinnati, Ohio, assignor to Bhat Industries, Inc., Cincinnati, Ohio

Filed May 12, 1994, Ser. No. 241,751
Int. Cl.[6] A62D *3/00*
U.S. Cl. 588—207 8 Claims

1. A method for the treatment of in-situ waste materials and in-process hazardous materials, said materials comprising PCBs, the method comprising the steps of:

preparing a mixture comprising at least 70 weight percent quicklime, 0.1 to 10 weight percent of aliphatic salts of sodium prepared by reacting an aliphatic acid composition consisting of 50 weight percent palmitic acid, 39 weight percent stearic acid, 5 weight percent oleic acid, 2.5 weight percent margaric acid, 2.5 weight percent myristic acid and 1 weight percent pentadecanoic acid with a compound selected from the group consisting of sodium hydroxide, sodium alkoxide, and mixtures thereof;

contacting said mixture with said materials to be treated, the weight ratio of said mixture to the dry weight of said waste ranging from 1:5 to 1:10;

absorbing said materials into said mixture to form a second mixture;

controlling the amount of water in said second mixture to achieve;

causing an exothermic reaction between said mixture and water while generating a temperature of at least 200° F.; and

breaking down said materials due to said exothermic reaction with the formation of a water insoluble powder.

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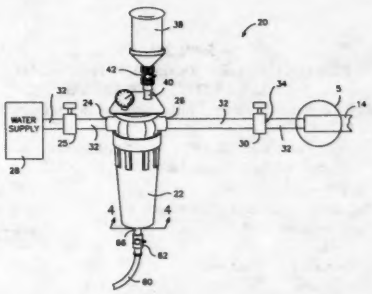
5,491,282

## APPARATUS AND METHOD FOR NEUTRALIZING A CONTAMINATED HEATING ELEMENT

Steven Engelking, and Robert R. Sanchez, both of San Antonio, Tex., assignors to Sony Corporation, Tokyo, Japan, and Sony Electronics Inc., Park Ridge, N.J.

Filed Aug. 22, 1994, Ser. No. 293,977
Int. Cl.[6] A62D *3/00;* B08B *3/08*
U.S. Cl. 588—261 20 Claims




1. An apparatus for neutralizing a contaminated heating element, comprising:

a housing having an inlet port for receiving water;

a container for holding a material;

a valve connected between said container and said housing for supplying a predetermined amount of said material to said water in said housing wherein said water and said material form a neutralizing agent; and

a conduit connected to said housing for supplying said neutralizing agent to said heating element for neutralizing said heating element.

**5,491,283**

**BRC/ABL TRANSGENIC ANIMALS AS MODELS FOR PHILADELPHIA CHROMOSOME POSITIVE CHRONIC MYELOGENOUS AND ACUTE LYMPHOBLASTIC LEUKEMIA**

**John Groffen; Nora Heisterkamp, and Paul K. Pattengale, all of Los Angeles, Calif., assignors to Childrens Hospital of Los Angeles, Los Angeles, Calif.**

**Continuation of Ser. No. 440,062, Nov. 22, 1989, abandoned. This application Jan. 14, 1993, Ser. No. 3,951**

**Int. Cl.[6] C12N** *15/00*

**U.S. Cl. 800—2** **15 Claims**

1. A transgenic mouse which carries a BCR/C-ABL transgene that comprises at least the first exon of a BCR gene and a functional portion of a c-ABL gene under the control of a metallothionine promoter sequence in its somatic and germ cells, whereby said BCR/c-ABL transgene is expressed in its bone marrow cells and is effective for promoting a leukemia in said mouse.

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**5,491,284**

**NUDE MOUSE MODEL FOR NEOPLASTIC DISEASE**

**Ann Monosov, and Xinyu Fu, both of San Diego, Calif., assignors to Anticancer Incorporated, San Diego, Calif.**

**Continuation of Ser. No. 719,814, Jun. 24, 1991, abandoned, which is a continuation-in-part of Ser. No. 253,990, Oct. 5, 1988, abandoned. This application Dec. 17, 1993, Ser. No. 169,735**

**Int. Cl.[6] A61K** *35/00;49/00*

**U.S. Cl. 800—2** **21 Claims**

1. A nude mouse model for human neoplastic disease, wherein said mouse is characterized by:

having histologically intact human neoplastic tissue of at least 1 $mm^3$ in size transplanted onto an organ of said mouse which corresponds to the human organ from which said tissue is originally obtained; and

having sufficient immuno-deficiency to allow said transplanted neoplastic tissue to grow and mimic the progression of the neoplastic disease in the human donor;

wherein said human neoplastic tissue is selected from stomach, colon, pancreatic or lung tissue.

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**5,491,285**

**PHYTOPHTHORA RESISTANCE GENE OF CATHARANTHUS AND ITS USE**

**Robert N. Bowman, Gilroy, Calif., assignor to Goldsmith Seeds Inc., Gilroy, Calif.**

**Filed Jan. 21, 1994, Ser. No. 184,319**

**Int. Cl.[6] A01H** *1/04;4/00;5/12;5/00;5/10*

**U.S. Cl. 800—200** **38 Claims**

1. A Catharanthus seed containing a genetic resistance to Phytophthora, wherein said seed has a pedigree which includes the plant 8424-3.

3. A Catharanthus plant produced by growing the seed of claim 1.

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**5,491,286**

**INBRED CORN LINE PHKM5**

**Roy Luedtke, Jr., Thompson, N. Dak., and Lori L. Carrigan, Spicer, Minn., assignors to Pioneer Hi-Bred International, Inc., Des Moines, Iowa**

**Filed Jan. 24, 1994, Ser. No. 187,280**

**Int. Cl.[6] A01H** *1/02;4/00;5/00;* **C12N** *5/04*

**U.S. Cl. 800—200** **10 Claims**

1. Inbred corn seed designated PHKM5, having the ATCC Accession No. 97218.

**5,491,287**

**HYBRID CORN PLANT AND SEED (3905)**

**Roy Luedtke, Jr., Thompson, N. Dak., and Gerhart P. Weber, Moorhead, Minn., assignors to Pioneer Hi-Bred International, Inc., Des Moines, Iowa**

**Filed Jan. 28, 1994, Ser. No. 188,515**

**The portion of the term of this patent subsequent to May 16, 2012, has been disclaimed.**

**Int. Cl.[6] A01H** *1/02;4/00;5/00;* **C12N** *5/04*

**U.S. Cl. 800—200** **4 Claims**

1. A hybrid corn plant designated 3905, grown from seed having A.T.C.C. accession number 97215, and its plant parts.

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**5,491,288**

**CHIMERIC GENE COMPRISING THE ARABIDOPSIS HISTONE H4 PROMOTER FOR THE TRANSFORMATION OF PLANTS**

**Nicole Chaubet; Claude Gigot, both of Strasbourg; Georges Freyssinet, St Cyr au Mont d'Or, and Bernard Leroux, Lozanne, all of, France, assignors to Rhone Poulenc Agrochimie, Lyon, France**

**Continuation of Ser. No. 847,597, Mar. 5, 1992, abandoned. This application May 9, 1994, Ser. No. 239,947**

**Claims priority, application France, Mar. 5, 1991, 91 02873**

**Int. Cl.[6] C12N** *15/29;15/63;15/82;15/00*

**U.S. Cl. 800—205** **15 Claims**

1. An isolated nucleic acid comprising in the 5' to 3' direction:

(a) a promoter region selected from the group consisting of a double CaMV 35S promoter region derived from a pRA-BL 410 clone positioned directly upstream of a histone H4 promoter derived from an *Arabidopsis thaliana* H4 A748 clone, and a 530 bp HindIII-NdeI fragment of an *Arabidopsis thaliana* clone H4 A777 histone H4 promoter positioned directly upstream of two tandemly repeated copies of a 330 bp NdeI-EcoRV fragment of the H4 A777 histone H4 promoter positioned directly upstream of a 140 bp EcoRV-EcO RI fragment of the H4 A777 histone H4 promoter;

(b) a nucleic acid sequence encoding a chloroplast transit peptide (CTP) region selected from the group consisting of

(i) the CTP from a maize RuBisCo SSU gene,

(ii) the CTP and 23 amino acids of the amino terminal region of the mature protein from the maize RuBisCO SSU gene,

(iii) the CTP from a sunflower RuBisCO SSU gene,

(iv) the CTP from the sunflower SSU gene positioned directly upstream of the first 23 amino acids of the mature maize RuBisCO SSU protein; and

(v) the CTP from the sunflower RuBisCO SSU gene positioned directly upstream of the first 23 amino acids of the mature maize RuBisCO SSU protein positioned directly upstream of the chloroplast transit peptide from the maize RuBisCO SSU gene.

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**5,491,289**

**HYBRID CORN PLANT AND SEED (3279)**

**Stephen W. Noble, Jr., Johnston, Iowa; Norman E. Williams, York, Nebr.; David S. Stucker, Princeton; Robert L. Segebart, Shelbyville, both of Ill., and Joseph W. Keaschall, Sharpsville, Ind., assignors to Pioneer Hi-Bred International, Inc., Des Moines, Iowa**

**Continuation of Ser. No. 831,240, Feb. 3, 1992, abandoned. This application Aug. 3, 1994, Ser. No. 285,602**

**Int. Cl.[6] A01H** *5/00;4/00;* **C12M** *5/04*

**U.S. Cl. 800—200** **5 Claims**

1. A hybrid corn plant designated as 3279 produced from seed having ATCC accession No. 97151, and its plant parts.

5,491,290

**HYBRID CORN PLANT AND SEED (3525)**

**William S. Niebur, Victor, France; Loren J. Hoffbeck, Tipton, Ind., and Terrill E. Williams, New Holland, Pa., assignors to Pioneer Hi-Bred International, Inc., Des Moines, Iowa**

**Continuation of Ser. No. 831,232, Feb. 3, 1992, abandoned. This application Aug. 4, 1994, Ser. No. 286,101**

**Int. Cl.**[6] **A01H** *1/00;5/00;* **C12N** *5/04*

**U.S. Cl. 800—200** **5 Claims**

1. A hybrid corn plant designated as 3525 produced from seed having ATCC accession No. 97152, and plant parts.

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5,491,291

**Patent Not Issued For This Number**

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5,491,292

**Patent Not Issued For This Number**

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5,491,293

**INBRED CORN LINE LH225**

**Scott Bergemann, Stanton, Minn., assignor to Holden's Foundation Seeds Inc., Williamsburg, Iowa**

**Continuation of Ser. No. 140,371, Oct. 21, 1993, Pat. No. 5,416,255. This application Nov. 21, 1994, Ser. No. 342,688**

**Int. Cl.**[6] **A01H** *5/00;1/02*

**U.S. Cl. 800—200** **4 Claims**

1. A method for producing first generation ($F_1$) hybrid corn seed, said seed being capable of producing a hybrid corn plant having the characteristics of wide leaves, robust plant type, and consistent and superior hybrid grain yield and dry down when compared to elite hybrids used in the northern corn region, comprising crossing a first inbred parent corn plant with a second inbred parent corn plant and harvesting the resultant first generation ($F_1$) hybrid corn seed, wherein said first or second parent corn plant is the corn plant of LH225, the seed of which have been deposited and have ATCC Accession No. 75565.

5,491,294

**IMBRED CORN LINE LH185**

**Richard J. Miller, Williamsburg, Iowa, assignor to Holden's Foundation Seeds Inc., Williamsburg, Iowa**

**Continuation of Ser. No. 163,024, Dec. 6, 1993, Pat. No. 5,416,261. This application Nov. 21, 1994, Ser. No. 342,942**

**The portion of the term of this patent subsequent to May 16, 2012, has been disclaimed.**

**Int. Cl.**[6] **A01H** *1/02;5/00;1/00*

**U.S. Cl. 800—200** **4 Claims**

1. A method for producing first generation ($F_1$) hybrid corn seed said seed being capable of producing a hybrid corn plant having the characteristics of excellent grain yield and good staygreen when compared to similarly adapted hybrids, comprising crossing a first inbred parent corn plant with a second inbred parent corn plant and harvesting the resultant first generation ($F_1$) hybrid corn seed, wherein said first or second parent corn plant is the corn plant of LH185, the seed of which have been deposited and have ATCC Accession No. 56618.

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5,491,295

**HYBRID CORN PLANT AND SEED**

**William S. Niebur, Victor, France; Raymond D. Riley, Humboldt County, and Stephen W. Noble, Polk County, both of Iowa, assignors to Pioneer Hi-Bred International, Inc., Des Moines, Iowa**

**Continuation of Ser. No. 962,443, Oct. 16, 1992, abandoned, which is a continuation of Ser. No. 649,786, Feb. 1, 1991, abandoned. This application Nov. 22, 1994, Ser. No. 323,273**

**Int. Cl.**[6] **A01H** *5/00;4/00;* **C12M** *5/04*

**U.S. Cl. 800—200** **6 Claims**

1. A hybrid corn plant designated as 3394 and its parts, and having ATCC accession number 97224.

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5,491,296

**INBRED CORN LINE LH176**

**Scott Bergemann, Stanton, Minn., assignor to Holden's Foundation Seeds, Inc., Williamsburg, Iowa**

**Filed Dec. 5, 1994, Ser. No. 349,365**

**Int. Cl.**[6] **A01H** *1/02;4/00;5/00;* **C12N** *5/04*

**U.S. Cl. 800—200** **10 Claims**

1. Inbred corn seed designated LH176 having ATCC accession No. 75952.

5,491,297

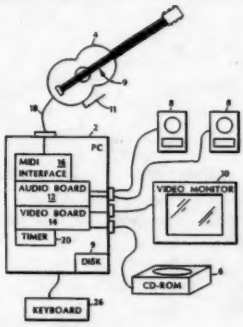
## MUSIC INSTRUMENT WHICH GENERATES A RHYTHM EKG

Charles L. Johnson, Cambridge, Mass.; Allan A. Miller, Hollis, N.H.; Herbert P. Snow, Somerville, Mass., and Vernon A. Miller, Mount Vernon, N.H., assignors to Ahead, Inc., Netwon, Mass.

Continuation-in-part of Ser. No. 73,128, Jun. 7, 1993, Pat. No. 5,393,926. This application Jan. 5, 1994, Ser. No. 177,741

Int. Cl.[6] G09B *15/04;* G10H *1/26*

U.S. Cl. 84—609 9 Claims




1. A musical instrument comprising:

an actuator which generates a plurality of actuation signals in response to being played by a user;

an audio synthesizer which generates audio tones in response to control signals;

a memory storing a musical score, said stored musical score comprising a sequence of lead notes each of which has an associated time stamp to identify a time at which it is supposed to be played by said user in said musical score;

a video display unit;

a digital processing means controlling said audio synthesizer and said video display unit,

said digital processing means receiving said plurality of actuation signals from said actuator and generating a sequence of control signals therefrom,

said digital processing means programmed to map the plurality of actuation signals from said actuator to a corresponding sub-sequence of lead notes from among said sequence of lead notes,

said digital processing means programmed to produce the sequence of control signals from the sub-sequence of lead notes, said sequence of control signals causing said synthesizer to generate sounds representing the sub-sequence of lead notes,

said digital processing means programmed to display on said video display unit a trace of markers as a function of time, wherein each of the markers within said trace of markers indicates a time at which the user is supposed to cause said actuator to generate one of the actuation signals of said plurality of actuation signals in order to cause the audio synthesizer to play a corresponding one of the sequence of lead notes of said musical score, said trace of markers representing a period of time extending from before an actual elapsed time until after the actual elapsed time, the actual elapsed time being measured from a start of the musical score, and

said digital processing means programmed to display on said video display unit an indicator marking a location of the actual elapsed time within said trace of markers and thereby indicating where the user is presently supposed to be within the musical score.

5,491,298

## AUTOMATIC ACCOMPANIMENT APPARATUS DETERMINING AN INVERSION TYPE CHORD BASED ON A REFERENCE PART SOUND

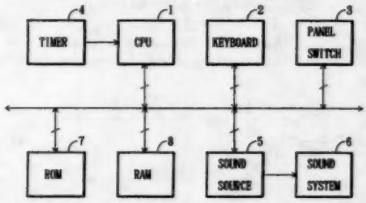
Aoki Eiichiro, Shizuoka, Japan, assignor to Yamaha Corporation, Hamamatsu, Japan

Continuation of Ser. No. 88,783, Jul. 8, 1993, abandoned. This application Mar. 7, 1995, Ser. No. 400,461

Claims priority, application Japan, Jul. 9, 1992, 4-182183

Int. Cl.[6] G10H *1/22;1/38*

U.S. Cl. 84—656 15 Claims




1. An automatic accompaniment apparatus wherein one of a plurality of component sounds of s chord which has a particular position in order of pitch is set as a reference part sound and an inversion type of the chord is determined from the reference part sound, and then sounds of the chord are produced in accordance with the inversion type thus determined, comprising:

reference part sound determination means for determining, as a production of sounds of chords proceeds, a reference part sound of a present chord in accordance with a musical interval relationship between component sounds of the present chord and a reference part sound of a preceding chord and further in accordance with a preset rule; and

inversion type determination means for determining an inversion type of the present chord based on the reference part sound of the present chord.

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5,491,299

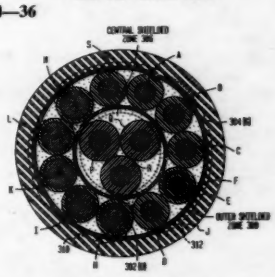
## FLEXIBLE MULTI-PARAMETER CABLE

Thomas K. Naylor, Belmont; Helen C. Crouse, Waltham, both of Mass., and Edwin Muz, Reutlingen, Germany, assignors to Siemens Medical Systems, Inc., Iselin, N.J.

Filed Jun. 3, 1994, Ser. No. 253,518

Int. Cl.[6] H01B *7/34*

U.S. Cl. 174—36 15 Claims



1. A flexible multi-parameter conductor cable having coaxially symmetric elongated zones for signal carrying conductor placement therein, comprising:

an electrically conductive inner shield defining an electrically shielded inner longitudinal zone symmetrically disposed along and defining a center of said cable for containing at least one of a first type of signal carrying conductor; and

an electrically conductive outer shield spaced a given distance symmetrically around said inner shield so as to define an electrically shielded outer longitudinal zone symmetrically disposed about said inner longitudinal zone for containing a plurality of at least a second type of signal carrying insulated

conductor arranged in a single layer adjacent one another as a group in said outer longitudinal zone, said second type of conductor having an electrically conductive outer jacket in electrical contact with said outer shield.

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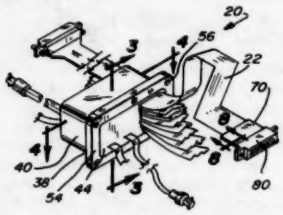
**5,491,300**

## PENETRATOR AND FLEXIBLE CIRCUIT ASSEMBLY FOR SEALED ENVIRONMENT

**Jon M. Huppenthal; Candy L. Saunders, both of Colorado Springs, and Joseph E. Jaramillo, Pueblo, all of Colo., assignors to Cray Computer Corporation, Colorado Springs, Colo.**

**Filed Apr. 28, 1994, Ser. No. 234,253**
**Int. Cl.[6] H01B** *17/30;* **H05K** *5/06*
**U.S. Cl. 174—151** **27 Claims**




**1**. A penetrator and flexible circuit apparatus for transmitting controlled impedance electrical signals between two environments separated by a wall, comprising:

a penetrator housing including a flange portion and a sleeve portion having a passageway through the penetrator housing;

at least one elongated flat flexible circuit having a plurality of hermetically bonded, substantially parallel electrical traces extending therealong, said electrical traces being capable of controlled impedance signal transmission, said flexible circuit extending through said passageway; and

a retention material substantially occupying the passageway and surrounding the flat flexible circuit, the retention material retaining the flexible circuit in the passageway of the penetrator housing and establishing a hermetic seal of the flexible circuit within the penetrator sleeve.

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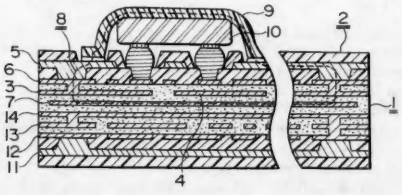
**5,491,301**

## SHIELDING METHOD AND CIRCUIT BOARD EMPLOYING THE SAME

**Yutaka Akiba, Fujisawa; Kunio Matsumoto, Yokohama; Makoto Iida, Kawasaki; Takashi Maruyama, Ebina; Tsutomu Hara, Fujisawa; Hitoshi Yoshidome, Hadano, and Kazuo Hirota, Chigasaki, all of, Japan, assignors to Hitachi, Ltd., Japan**

**Filed Dec. 22, 1993, Ser. No. 172,413**
**Claims priority, application Japan, Dec. 28, 1992, 4-347685**
**Int. Cl.[6] H05R** *1/00*
**U.S. Cl. 174—250** **12 Claims**




**1**. A circuit board comprising:

a power source layer;

a ground layer;

a signal line positioned between said power source layer and said ground layer; and

conductor patterns positioned in the peripheral portions of the signal line, wherein said power source layer and said ground layer are positioned at the upper and lower surfaces of said signal line and said conductor patterns, and said power source layer is capacitively coupled with said ground layer through said conductor patterns in the peripheral portions of said signal line, and said signal line is enclosed in a three dimensional manner, thereby to form a shielding structure.

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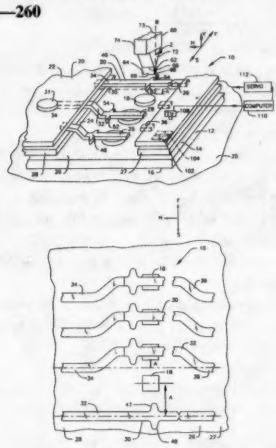
**5,491,302**

## MICROELECTRONIC BONDING WITH LEAD MOTION

**Thomas H. Distefano, Monte Sereno; Zlata Kovac, Los Gatos, and John Grange, Cupertino, all of Calif., assignors to Tessera, Inc., San Jose, Calif.**

**Filed Sep. 19, 1994, Ser. No. 308,741**
**Int. Cl.[6] H05K** *1/14*
**U.S. Cl. 114—260** **36 Claims**



**1**. A method of connecting a part of a microelectronic assembly having a plurality of contacts disposed in a row to a connection component including a plurality of leads having connection sections disposed side by side in a row, said method comprising the steps of:

(a) juxtaposing said connection component with said part of the microelectronic assembly so that said row of connection sections is disposed above said row of contacts in alignment therewith and so that each connection section is offset from a corresponding contact in a first direction along said rows;

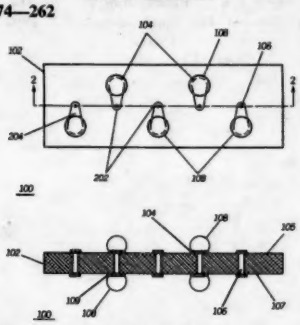
(b) connecting the connection sections to the corresponding contacts by performing a connection cycle on said connection sections in sequence along the row in said first direction, the connection cycle for each connection section including the steps of engaging the connection section with a tool and moving the engaged connection section and tool downwardly and in a second direction opposite to said first direction into engagement with the corresponding contact, whereby during each connection cycle the tool and the engaged connection section move away from the next adjacent unconnected connection section.

5,491,303

## SURFACE MOUNT INTERPOSER

Michael L. Weiss, Coral Springs, Fla., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Mar. 21, 1994, Ser. No. 210,509
Int. Cl.[6] H05K 1/14
U.S. Cl. 174—262 5 Claims



1. A printed circuit assembly, comprising:
a first printed circuit board having a plurality of solder pads;
a second printed circuit board having a plurality of solder pads;
an interposer, comprising;
a circuit-carrying substrate having two major opposing surfaces and having a plurality of electrically conductive vias;
a plurality of first solder pads on one of the major surfaces, corresponding to the plurality of solder pads on the first printed circuit board, each of said first solder pads electrically connected to an electrically conductive via;
a plurality of second solder pads on the other major surface, corresponding to the plurality of solder pads on the second printed circuit board, each of said second solder pads electrically connected to an electrically conductive via and to a corresponding first solder pad; and
a solder bump on each of said first and second solder pads, and;
the interposer electrically and mechanically connected to the first and second printed circuit boards by means of the solder bumps being soldered to the plurality of solder pads on the first and second printed circuit boards.

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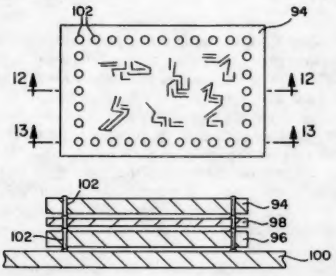
5,491,304

## CONNECTOR FOR INTEGRATED CIRCUIT CHIPS

James C. Kei Lau, Torrance; Richard P. Malmgren, Rancho Dominguez, and Ronald A. DePace, Mission Viejo, all of Calif., assignors to TRW Inc., Redondo Beach, Calif.

Division of Ser. No. 10,235, Jan. 28, 1993, Pat. No. 5,376,226.
This application Sep. 29, 1994, Ser. No. 315,017
Int. Cl.[6] H05K 1/16
U.S. Cl. 174—264 15 Claims



1. A connector for electrically coupling first and second groups of circuit contact points formed on first and second integrated electronic circuit chips respectively, comprising:
a connector board having a first and second side and being formed of a dielectric material, said connector board having a plurality of openings formed therethrough; and
a matching plurality of electroplated conductive members each extending through one of said openings and having an anchor portion on said second side of said connector board, said anchor having a larger lateral dimension than the opening, each of said conductive members further having a via portion extending from the anchor through said opening and expanding laterally onto said first side of said connector board to form a head portion having a lateral dimension larger than said opening, said anchors and head portions being arranged to align with and contact said first and second group of circuit contact points formed on said first and second integrated electronic circuit chips, respectively, and to position said first and second integrated electronic circuit chips in a spaced relationship from said connector board to allow heat dissipation.

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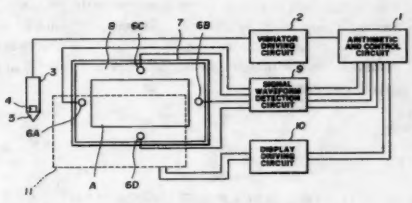
5,491,305

## VIBRATION TRANSMISSION PLATE FOR INPUTTING COORDINATES

Tatsuro Kawakami, Yokohama; Yuichiro Yoshimura, Kamakura, and Katsuyuki Kobayashi, Yokohama, all of, Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Jan. 15, 1993, Ser. No. 5,213
Claims priority, application Japan, Jan. 24, 1992, 4-011254; Aug. 5, 1992, 4-208980
Int. Cl.[6] G08C 21/00; G09G 3/02
U.S. Cl. 178—19 20 Claims




1. A two-layer vibration transmission plate for use in a vibration input apparatus for inputting coordinates to detect vibrations input by a vibration input pen, with the vibration input apparatus having a plurality of sensors provided on said two-layer vibration transmission plate to detect the contact coordinates of the vibration input pen on said two-layer vibration transmission plate, said two-layer vibration transmission plate comprising:
an input layer for receiving the vibrations input by the vibration input pen, said input layer having a top input surface to be contacted by the vibration input pen and a bottom surface; and
a vibration propagating layer in contact with said bottom surface of said input layer for propagating ultrasonic vibrations to the plurality of sensors, wherein
glass is used as a material for said vibration propagating layer, and said input layer is made of a material having a flexural modulus of elasticity within a range between 180.0 and 720.0 $kgf/mm^2$.

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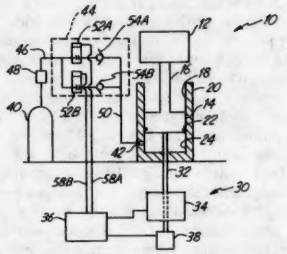
5,491,306

## MASS OSCILLATOR HAVING AN ADJUSTABLE GAS SPRING

Martin M. Gram, St. Louis Park, Minn., assignor to MTS Systems Corporation, Eden Prairie, Minn.

Filed Mar. 25, 1994, Ser. No. 218,127
Int. Cl.[6] G01V 1/40; 1/04
U.S. Cl. 181—106 27 Claims

1. An apparatus for oscillating a mass at a plurality of selected frequencies, the apparatus comprising:




a source of compressible fluid at a source pressure;

a cylinder having a bore filled with the compressible fluid and a port opening to the bore;

a piston slidable in the bore to define a chamber, the piston reciprocating in the bore to define an average volume of the chamber, the piston being operably connected to the mass to oscillate the mass at a selected frequency, and wherein a pressure in the chamber varies during reciprocating displacement of the piston above and below the source pressure; and

a valve apparatus connecting the port to the source of compressible fluid, the valve apparatus including a first check valve for adjusting the average volume of the chamber to change the frequency of the oscillating mass by allowing compressible fluid to flow into the chamber from the source to increase the average volume when the pressure of the chamber is less than the source pressure, and a second check valve for adjusting the average volume of the chamber to change the frequency of the oscillating mass by allowing compressible fluid to flow from the chamber to the source to decrease the average volume when the pressure of the chamber is greater than the source pressure.

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**5,491,307**

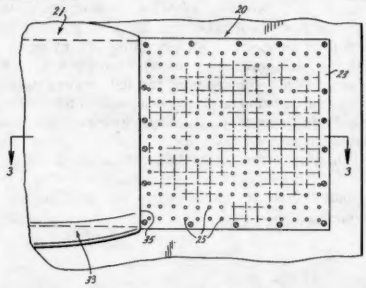
**POROUS SINGLE EXPANSION RAMP**

**Richard W. Wlezien, Darien, Ill., assignor to McDonnell Douglas Corporation, Huntington Beach, Calif.**

**Filed Oct. 5, 1990, Ser. No. 592,998**

**Int. Cl.[6] F02K** *1/00*

**U.S. Cl. 181—213** **4 Claims**




1. In a nozzle of the type capable of exhausting supersonic fluid flow which forms standing shock waves generating noise having an amplitude, and having a ramp extending therefrom, the improvement comprising:

said ramp having a face lying adjacent the supersonic fluid flow;

holes which pass through said face and entirely through said ramp; and

said face having a porosity of at least four percent, whereby compression waves are created in the supersonic fluid flow and the amplitude of the noise is decreased.

**5,491,308**

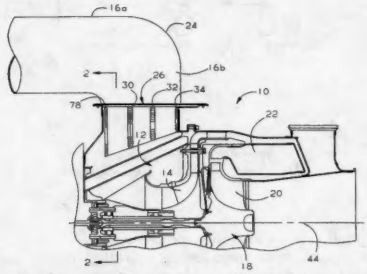
**TURBINE INLET SILENCER**

**James C. Napier, and Robert G. Thompson, both of San Diego, Calif., assignors to Sundstrand Corporation, Rockford, Ill.**

**Division of Ser. No. 719,651, Jun. 21, 1991, Pat. No. 5,140,819, which is a continuation of Ser. No. 414,115, Sep. 28, 1989, abandoned. This application Apr. 9, 1992, Ser. No. 866,142**

**Int. Cl.[6] E04F** *17/04*

**U.S. Cl. 181—224** **5 Claims**




1. A modular sound attenuation assembly for an auxiliary power unit having an air inlet duct leading to a radial compressor, comprising:

a frame including a pair of spaced apart end plates;

a plurality of baffles extending between said end plates, each of said baffles having sound attenuation means associated therewith, said baffles being disposed in parallel, spaced apart relation; and

means for removably securing said sound attenuation assembly to said auxiliary power unit by securing said frame within said air inlet duct, said sound attenuation assembly being removably secured such that said baffles are positioned generally perpendicular to the direction of flow of air through said air inlet duct from a source, said baffles each extending generally perpendicular to an axis of said radial compressor.

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**5,491,309**

**ACOUSTICAL PANEL SYSTEM**

**Rodman W. Kotter, Culver City, Calif., assignor to Quilite International Limited Liability Company, Los Angeles, Calif.**

**Continuation-in-part of Ser. No. 817,155, Jan. 6, 1992, abandoned, which is a continuation-in-part of Ser. No. 586,793, Sep. 24, 1990, Pat. No. 5,077,949, which is a continuation-in-part of Ser. No. 355,788, May 19, 1989, Pat. No. 4,958,476, which is a division of Ser. No. 174,516, Mar. 28, 1988, abandoned. This application Oct. 4, 1993, Ser. No. 131,445**

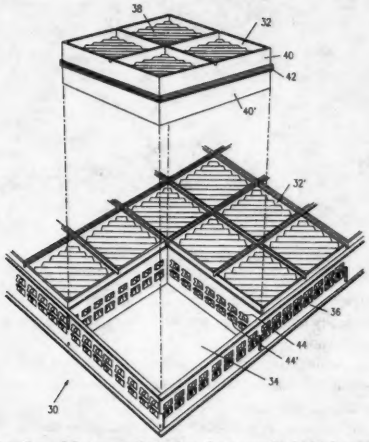
**Int. Cl.[6] E04B** *1/00*

**U.S. Cl. 181—285** **28 Claims**

1. An acoustical panel system, comprising:

an acoustical block including a first panel and a second panel, each of the panels having at least one continuous body portion and a laterally-extending edge portion surrounding the periphery of the body portion, each body portion of each panel including a laterally-extending panel face that is raised relative to the edge portion of the panel and a generally upright sidewall projecting away from the panel face around the perimeter thereof and joining the panel face to the edge portion of the panel, the panel face of each body portion having corrugations formed therein, and wherein the first and second panels are disposed in back-to-back relationship with the edge portions of the first panel adjoined to the edge portions of the second panel so that opposing panel faces of the body portions of the panels are spaced apart to form a closed and hollow brick-like structure;

a frame defining an opening into which the acoustical block is received; and



a plurality of fasteners fastening the acoustical block within the opening in the frame.

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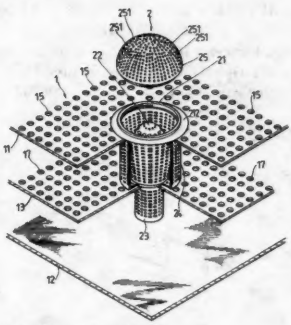
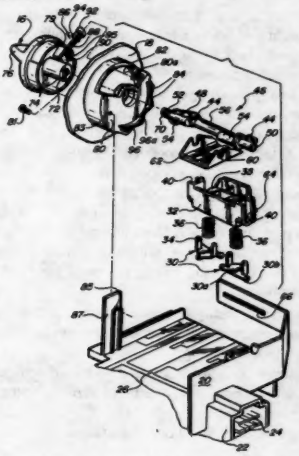
**5,491,310**
**ACOUSTIC BOARD**
**Wang H. Jen, P.O. Box 82-144, Taipei, Taiwan, Prov. of China**
**Continuation-in-part of Ser. No. 568,029, Aug. 16, 1990, Pat. No. 5,004,070, and a continuation-in-part of Ser. No. 906,424, Jun. 30, 1992, Pat. No. 5,185,504. This application Sep. 7, 1994, Ser. No. 301,648**
**Int. Cl.[6] E04B** *1/82*
**U.S. Cl. 181—286** **2 Claims**



1. An acoustic board comprising:
a front panel formed with a plurality of large openings and small openings;
a rear panel having a distance from said front panel;
an intermediate panel fitted between said front panel and said rear panel thereby forming a front chamber between said front panel and said intermediate panel and a rear chamber between said intermediate panel and said rear panel and having a plurality of large holes and small holes; and
a plurality of sound collecting devices each including a conical hood, a cover, an outer housing and a front silencer, said conical hood having a large end engaged with one of the large openings of said front panel and provided at a small end with a rear silencer which has a plurality of perforations and extends through one of the large holes of said intermediate panel into said rear chamber, said cover being engaged with the large end of said conical hood, said outer housing being fitted over said conical hood within said front chamber, said front silencer being fitted within said conical hood and positioned on said rear silencer.

**5,491,311**
**MULTIFUNCTION SWITCH**
**Orlando F. Muscat, Novi; Robert D. Muller, Royal Oak, and Mark Feldman, Farmington Hills, all of Mich., assignors to United Technologies Automotive, Inc., Dearborn, Mich.**
**Filed Nov. 8, 1993, Ser. No. 149,667**
**Int. Cl.[6] H01H** *9/00*
**U.S. Cl. 200—4** **16 Claims**



1. A switch mechanism comprising:
an actuating knob adapted to be moved in rotational and in and out directions;
a shaft operably coupled to said knob and adapted to be moved thereby;
a single contact carrier mounted to said shaft and adapted to be moved therewith, said contact carrier having mounted thereto at least two electrically conductive contacts; and
at least two circuit paths formed on a substrate surface, said electrically conductive contacts being moved along said surface in orthogonal directions into and out of electrical engagement with said circuit paths to effect electrical switching.

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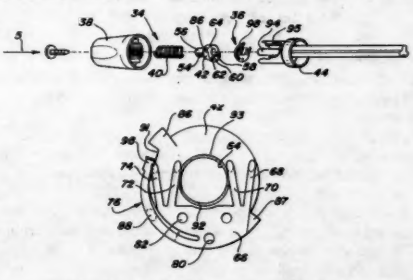
**5,491,312**
**COMBINATION WASH/WIPER CONTACT SUBASSEMBLY**
**LaVerne R. Newman, Southfield, and Dragan Bogovican, Sterling Heights, both of Mich., assignors to United Technologies Automotive, Inc., Dearborn, Mich.**
**Filed Sep. 19, 1994, Ser. No. 308,241**
**Int. Cl.[6] H01H** *9/00;1/36*
**U.S. Cl. 200—61.54** **7 Claims**



1. A combination wash/wiper contact member for a multifunction wash/wiper switch assembly for a vehicle for controlling at least one wiper blade associated with a windshield of the vehicle

and for controlling the application of windshield washer solvent from the switch assembly, said wash/wiper contact member comprising:

a central body portion;

a plurality of wiper contact arms protruding outwardly from said central body portion, each arm having a first end and a second end, said first end being integrally formed with said central body portion, said second end being formed for selective contact with a first electrically conductive surface, each of said plurality of wiper contact arms extending away from a plane formed by said central body portion;

a wash contact arm integrally formed with said central body portion and protruding outwardly away from said plane in a direction opposite that of said plurality of wiper contact arms for selective contact with a second conductive surface co-planar with said first conductive surface; and

said wash/wiper contact member being securable as a single component to an actuator member of said switch assembly.

4. A wash/wiper switch control assembly for a vehicle for controlling a plurality of windshield wipers of the vehicle and for controlling the application of windshield washer solvent to a windshield of a vehicle, said switch assembly comprising:

a cover member;

a spring at least partially disposed within said cover member;

an actuator member operably associated with said spring so as to be biased by said spring;

a lever member operably associated with said actuator member so as to allow said actuator member to rotate within a portion of said lever member;

a wash/wiper contact member comprising:

a central body portion;

a plurality of wiper contact arms protruding outwardly from said central body portion, each arm having a first end and a second end, said first end being integrally formed with said central body portion, said second end being formed for selective contact with a first electrically conductive surface, each of said plurality of wiper contact arms extending away from a plane formed by said central body portion;

a wash contact arm integrally formed with said central body portion and protruding outwardly away from said plane in a direction opposite that of said plurality of wiper contact arms for selective contact with a second conductive surface co-planar with said first conductive surface; and

said wash/wiper contact member being securable as a single piece component to said actuator member and positioned within said portion of said lever member so as to rotate in accordance with said actuator member.

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**5,491,313**

## HALO LIGHTING FOR KEYPAD SWITCH ASSEMBLIES

**Robert M. Bartley, Ravenna; Michael E. Conway, Youngstown, and Harry J. Millard, III, Berlin Center, all of Ohio, assignors to General Motors Corporation, Detroit, Mich.**

**Filed Jul. 22, 1994, Ser. No. 279,147**

**Int. Cl.[6] H01H** *9/00*

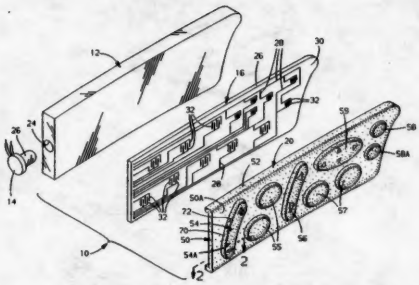
**U.S. Cl. 200—310** **9 Claims**

1. An illuminated elastomeric keypad switch assembly comprising an optical conductor which is adapted to be connected with a light source,

a printed circuit means secured at a lower surface thereof to said optical conductor and which is adapted to be electrically connected to various electrical devices to be energized and de-energized,

said printed circuit means having a transparent base and a plurality of printed circuit traces on said base which terminate in contact ends closely adjacent each other,

a one piece keypad made from an elastomeric material and overlying an upper surface of said printed circuit means, said keypad having a base of a thickness such that light from the optical conductor does not pass therethrough, a plurality of



opaque key caps each having a bottom surface carrying an electrically conductive pellet and located above a pair of said contact ends,

and thin annular translucent webs integral with said base of said key pad and integral with said key caps for connecting said key caps to said base of said key pad,

said thin annular webs biasing said key caps toward a normal position in which said pellets carried by said key caps are spaced from the contact ends of said printed circuit traces, said key caps being depressible to deflect said annular webs to move the pellets carried thereby to engage said contact ends of said printed circuit traces to complete a circuit,

said annular webs functioning as both a spring to bias the key caps toward their normal position and to transmit light from said optical conductor therethrough to create a halo lighting effect around said key caps.

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**5,491,314**

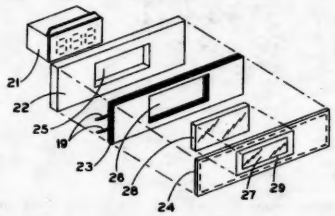
## FLAT HIGH TEMPERATURE MEMBRANE SWITCH DISPLAY WINDOW

**Paul S. Dorsey, Concord Township, Champaign County, Ohio, assignor to Whirlpool Corporation, Benton Harbor, Mich.**

**Filed Aug. 11, 1994, Ser. No. 289,262**

**Int. Cl.[6] H01H** *9/00*

**U.S. Cl. 200—313** **17 Claims**



1. A flat, high temperature membrane switch display window comprising:

a display having a length dimension and a height dimension;

a rigid substructure having a center hole of the approximate dimensions of said display located adjacent to the display;

multiple switch layers having a center hole of the approximate dimensions of said display located adjacent to the rigid substructure;

an overlay having a display window having the approximate dimensions of said display located approximately in the center of the overlay, said overlay further having an interior side and an exterior side wherein the interior side of the overlay is located adjacent to the multiple switch layers; and

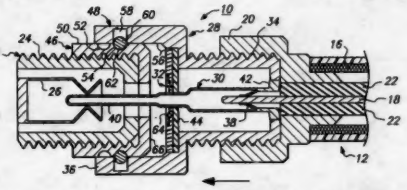
a rigid clear part affixed to said interior side of said overlay by an adhesive wherein the adhesive is affixed only to a peripheral edge of said clear part.

## 5,491,315

## SWITCHING DEVICE WITH SLIDABLE SWITCH

**Corey McMills, Los Altos, and John Mattis, Sunnyvale, both of Calif., assignors to Raychem Corporation, Menlo Park, Calif.**

**Filed Sep. 7, 1993, Ser. No. 118,120**
**Int. Cl.[6] H01H** *1/38*
**U.S. Cl. 200—504** **14 Claims**



**1**. A switching device for electrically activating and deactivating a coaxial cable junction between a first coaxial cable component and a second coaxial cable component, both having external and internal conductors, the switching device comprising:

(a) an electrically conductive housing having a first end adapted to be physically connected to the external conductor of the first component, and a second end adapted to be physically connected to the external conductor of the second component;

(b) an interior member disposed within the housing, the interior member having a first end adapted to be electrically connected to the internal conductor of the first component, and a second end adapted to be electrically connected to the internal conductor of the second component;

(c) a first electrically conductive path between the first end of the interior member and the second end of the interior member;

(d) a slidable switch disposed within the conductive path, the switch capable of being alternated between (i) a first position wherein high frequency electrical signals are substantially transmittable between the first and second coaxial cable components, and (ii) a second position wherein high frequency electrical signals are substantially not transmittable between the first and second coaxial cable components; and

(e) a second electrically conductive path between the switch and the housing, wherein, in the second switch position, the second electrically conductive path electrically connects the first electrically conductive path to the housing, thereby substantially preventing the transmission of signals between the first and second coaxial cable components;

wherein the first electrically conductive path is formed by conductive material extending continuously from the first end of the interior member to the second end of the interior member, and wherein the second electrically conductive path comprises an electrically conductive disc extending radially outwardly from the interior member.

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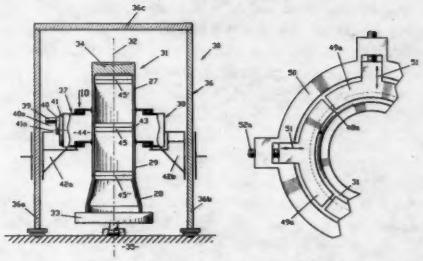
## 5,491,316

## PROCESS AND DEVICE FOR THE ELECTRON BEAM WELDING OF TWO PARTS OF A COMPONENT OF LARGE SIZE AND IN PARTICULAR OF A STEAM GENERATOR OF A PRESSURIZED WATER NUCLEAR REACTOR

**Gerard Boula, Meursault, and Yves Faunier, Chatenay Le Royal, both of, France, assignors to Framatome, Courbevoie, France**

**Filed May 12, 1994, Ser. No. 241,652**
**Claims priority, application France, May 12, 1993, 93 05724**
**Int. Cl.[6] B23K** *15/04*
**U.S. Cl. 219—121.13** **4 Claims**

**1**. A device for the electron beam welding of two component parts of a component of large size interconnected along a joint region which is of substantially annular shape and opens onto an outer cylindrical surface of said component, said device comprising, in combination:



(a) an enclosure having a first part including means for fixing said enclosure in a fluid-tight manner around said outer cylindrical surface of said component and a second part mounted on said first part in a fluid-tight manner and movable in rotation around an axis of rotation with respect to said first part;

(b) an electron gun mounted on said second part of said enclosure in such a manner as to direct an electron beam toward an interior side of said enclosure;

(c) means for moving said first and said second parts of said enclosure in rotation relatively to each other around said axis of rotation;

(d) wherein said first part of said enclosure comprises two units, each unit comprising a ring defining radially extending recesses, and a plurality of annular sectors having said axis of rotation as a common axis guided in radial directions in said recesses in said ring, and means for radially displacing each of said sectors selectively in a direction toward and away from said outer cylindrical surface of said component, and an inflatable annular sealing element engaged in an inner peripheral part of said annular sectors.

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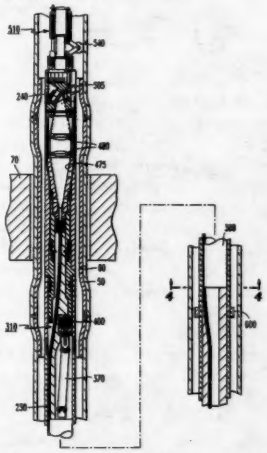
## 5,491,317

## SYSTEM AND METHOD FOR LASER WELDING AN INNER SURFACE OF A TUBULAR MEMBER

**William E. Pirl, Levelgreen, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.**

**Filed Sep. 13, 1993, Ser. No. 126,212**
**Int. Cl.[6] B23K** *26/00*
**U.S. Cl. 219—121.64** **28 Claims**



**16**. A method of welding an inner surface of a tubular member having a longitudinal axis, comprising the steps of:

(a) generating high intensity laser light by operating laser light generating means;

(b) emitting a homogenized light beam by conducting the light through light conducting means configured to homogenize the light, the light conducting means being optically coupled to the laser light generating means; and

(c) reflecting the homogenized light beam onto the inner surface of the tubular member to weld the inner surface by optically coupling light reflecting means to the light conducting means and to the inner surface, said step of reflecting the light beam including the step of preventing fouling of the light reflecting means by orienting the light reflecting means between approximately 10° and 20° with respect to the longitudinal axis of the tubular member.

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**5,491,318**

**LASER CUTTING MACHINE**

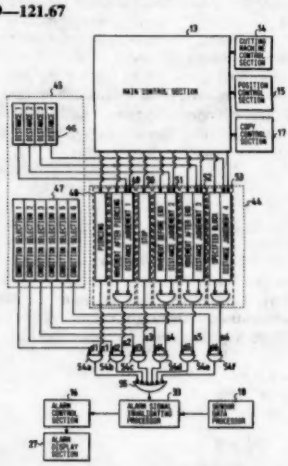
**Masayuki Sugawara, and Toshihiro Mori, both of Aichi, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan**

**Filed Jan. 7, 1994, Ser. No. 178,904**

**Claims priority, application Japan, Mar. 25, 1993, 5-066625**

**Int. Cl.[6] B23K** *26/00*

**U.S. Cl. 219—121.67** **6 Claims**



1. A laser cutting machine having a laser oscillator, an optical condenser system for directing a laser beam output from said laser oscillator onto a workpiece, a cutting head for holding said optical condenser system therein, a distance measuring means for measuring a distance between said cutting head and said workpiece, an alarm signal output section for judging an excess of an output signal of said distance measuring means over a predetermined range as an alarm state and providing an alarm signal, an alarm display section for receiving the alarm signal from said alarm signal output section and displaying an alarm, and an alarm signal invalidating means for invalidating said alarm signal, said laser cutting machine comprising:

a condition setting section for selecting an alarm signal invalidating condition under which said alarm signal is invalidated;

a condition judging section for judging whether an alarm signal invalidating condition has been established; and

means for comparing the selected alarm signal invalidating condition selected by said condition setting section with the alarm invalidating condition established by said condition judging section to judge whether said alarm signal is invalidated.

**5,491,319**

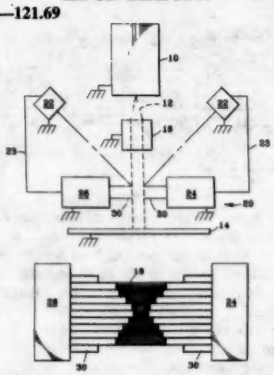
**LASER ABLATION APPARATUS AND METHOD**

**Laertis Economikos; Robert Hannon, both of Wappingers Falls, and Richard P. Surprenant, Poughkeepsie, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed Dec. 19, 1994, Ser. No. 359,228**

**Int. Cl.[6] B23K** *26/06*

**U.S. Cl. 219—121.69** **4 Claims**



1. A laser ablation tool for removing undesired portions of a workpiece comprising:

means for generating a beam of optical energy having a cross-section including means for directing said beam at said workpiece along a, path;

means in the path of said beam for shaping the cross-section of said beam, said means including first and second linear actuators on opposite sides of said beam path, each of said actuators having a plurality of linear members with each linear member adjacent to and in contact with another of said linear members, and means for individually inserting and retracting each of said members into and out of said beam path a desired distance to thereby shape said beam so as to remove only undesired portions of said workpiece; and

a servo control having a position sensor for sensing the position of each of said linear members and an actuator control for controlling the positions of said linear members.

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**5,491,320**

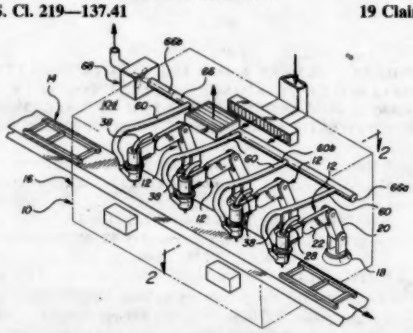
**METHOD AND APPARATUS FOR WELDING VENTILATION**

**Kenneth D. Taylor, Troy, Mich., assignor to Apex Engineering Company, Madison Heights, Mich.**

**Filed Sep. 30, 1994, Ser. No. 315,544**

**Int. Cl.[6] B23K** *9/16*

**U.S. Cl. 219—137.41** **19 Claims**



1. A method of removing the gaseous welding byproducts generated by a robotic welder of the type including a robotic arm and

a welding head position on a free end of the arm and defining a head structure, a welding locus, and a nozzle extending downwardly from the head structure for feeding welding materials along a feed axis defined by the nozzle from the head structure to the welding locus, the method comprising:

providing a hood having an upper mounting structure and an annular skirt extending downwardly from the upper mounting structure and defining a lower opening;

positioning the hood upper mounting structure on the head structure with the annular skirt extending downwardly in surrounding relation to the nozzle and with the lower skirt opening positioned proximate the welding locus, whereby to define a capture chamber extending upwardly from the lower opening in surrounding relation to the nozzle; and

creating a vacuum condition in the capture chamber to move the gaseous welding bi-products generated at the welding locus upwardly into the capture chamber.

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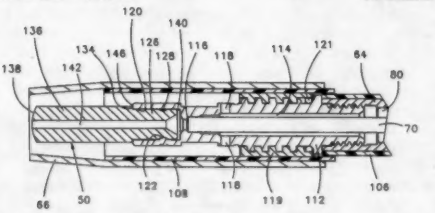
## 5,491,321
## WELDING GUN ASSEMBLY

**Kyle H. Stuart, and Dale R. Bervig, both of Wichita, Kans., assignors to Tweco Products, Inc., Wichita, Kans.**

**Continuation-in-part of Ser. No. 843,322, Feb. 26, 1992, Pat. No. 5,338,917. This application Jan. 11, 1993, Ser. No. 2,613**

**Int. Cl.[6] B23K** *9/173*

**U.S. Cl. 219—137.61** **37 Claims**




1. A welding gun assembly including:

A. A handle member having forward and rear end portions thereon and a means for actuating the flow of a welding wire, inert gas and electrical current therethrough;

B. Said welding wire being supplied by a spool member operatively associated with said assembly;

C. Said inert gas being supplied by a gas source operatively associated with said assembly;

D. Said electrical current being supplied by a power source operatively associated with said assembly;

E. A generally tubular conductor tube having forward and rear end portions and which extends from said forward end portions of said handle member and wherein said welding wire, inert gas and electrical current are received therethrough;

F. A generally cylindrical gas diffuser having a forward end portion and a rear end portion operatively associated with said forward end portion of said conductor tube, said gas diffuser being formed of a material which conducts said electrical current therethrough and is shaped to receive said welding wire therethrough, said gas diffuser including a first passageway which extends through at least a portion thereof and a retaining means which extends inwardly into said passageway; and

G. A generally cylindrical contact tip having forward and rear end portions, said contact tip including a circumferential channel on said rear end portion thereof, a tangential flat surface extending along at least a portion of said rear end portion and intersecting said channel, and a circumferential shoulder disposed between said forward end portion and said channel, said channel being sized to conductively receive said retaining means therein such that electrical current may be conducted therebetween, said shoulder being adapted for abutting contact with said forward end portion of said gas diffuser when said retaining means is received in said channel.

## 5,491,322
## DRIP COFFEE MAKER FOR USE WITHIN A MICROWAVE OVEN

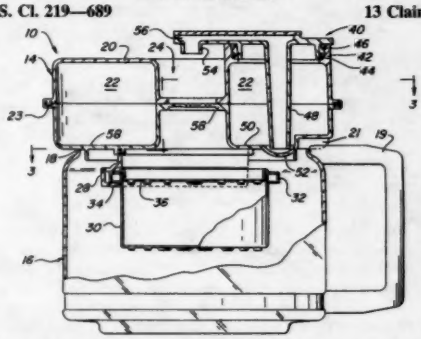
**Gordon Waligorski, Delphi, Ind., assignor to Farberware, Inc., Bronx, N.Y.**

**Division of Ser. No. 310,447, Feb. 13, 1989, Pat. No. 4,999,466. This application Jan. 9, 1991, Ser. No. 638,914**

**The portion of the term of this patent subsequent to Mar. 12, 2008, has been disclaimed.**

**Int. Cl.[6] H05B** *6/80*

**U.S. Cl. 219—689** **13 Claims**




1. An apparatus for use within a microwave oven, comprising: a reservoir defining a closed chamber for retaining a quantity of water for heating by microwave energy, a carafe for receiving a quantity of heated water, pump tube means removably attached to the reservoir, the pump tube means having an inlet and an outlet end, the inlet end extending into the reservoir to a position adjacent the bottom surface of the chamber, the attachment of the pump tube means to the reservoir sealing the chamber from ambient air pressure, a basket having a perforated bottom surface supported below the outlet end of the pump tube means, whereby the microwave energy of the oven is directed onto the water retained in the reservoir, heating the water, the heating of the water in the closed, sealed chamber of the reservoir means over time increasing vapor pressure within the reservoir, the pressure increase forcing the heated water through the inlet end of the pump tube means and to be discharged from the outlet end, the water passing through the basket and into the carafe positioned below the basket.

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## 5,491,323
## HIGH FREQUENCY HEATING APPARATUS FOR HEATING A MATERIAL AND A METHOD OF HEATING A MATERIAL BY HIGH FREQUENCY IRRADIATION

**Fumiko Mori, Osaka, and Haruo Matsushima, Yamatokoriyama, both of, Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan**

**Filed Dec. 21, 1993, Ser. No. 170,889**

**Claims priority, application Japan, Dec. 21, 1992, 4-340041; Feb. 10, 1993, 5-022314; Aug. 10, 1993, 5-198131; Sep. 8, 1993, 5-223297**

**Int. Cl.[6] H05B** *6/68*

**U.S. Cl. 219—710** **18 Claims**

1. A high frequency heating apparatus for heating a material, said apparatus comprising:

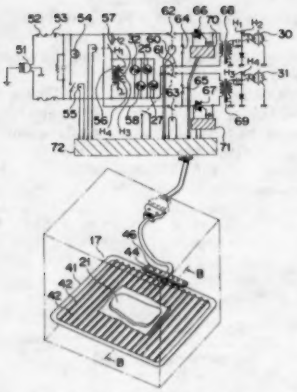
a heating chamber for accommodating said material; a high frequency wave irradiation source for irradiating high frequency waves into said heating chamber;

a desired temperature setter for setting a desired temperature to which said material is to be heated;

a threshold temperature setter for setting a threshold temperature which is lower than said desired temperature;

a surface temperature detector for detecting a temperatures of a surface portion of said material;

a center temperature detector for detecting a temperature of a center portion of said material;



a calculator for calculating a difference between said surface temperature and said center temperature and for producing a difference temperature; and

a controller for controlling said irradiation source such that said irradiation source irradiates high frequency waves when the following three conditions are satisfied;

(i) said difference temperature is within a predetermined set range;

(ii) said surface temperature is less than said desired temperature; and

(iii) said center temperature is less than said threshold temperature.

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**5,491,324**

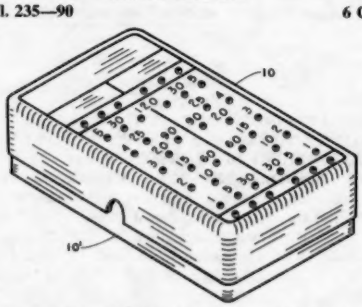
**SCORE-KEEPING-WITH-CARRY SCORE BOARDS**

**Frank Vanderpool, 918 Washington Ave., Iowa Falls, Iowa 50126**

**Filed May 12, 1994, Ser. No. 241,480**

**Int. Cl.[6] A63F** *1/18*

**U.S. Cl. 235—90** **6 Claims**



1. A score-keeping-with-carry system comprising: At least one score board comprising:

at least one display area for point totals comprising virtual mirror-image display areas;

a plurality of indicators;

means for calculating point-value changes on said score board so as to accumulate and display the point totals; said calculating means comprising a plurality of data sites having numerical identification and multiple point-values associated with each of said data sites, respectively;

each of said virtual mirror-image display areas including at least three columns of said data sites; the numerical identification and multiple point values associated with the data sites of each of said columns having a numerical base different than a numerical base of any other of the columns of said data sites;

means for physically recording information for displaying the point totals on said score board such that said indicators designate said data sites.

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**5,491,325**

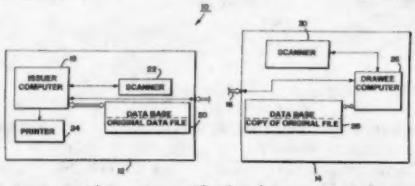
**METHOD AND SYSTEM FOR PAYMENT AND PAYMENT VERIFICATION**

**Dorge O. Huang, 3540 S. Parnell, 1st Flr., Chicago, Ill. 60609-1727, and Robert B. Peterson, 603 S. Wesley, Oak Park, Ill. 60304**

**Continuation of Ser. No. 935,021, Aug. 25, 1992, abandoned. This application Nov. 15, 1994, Ser. No. 339,917**

**Int. Cl.[6] G06F** *17/60*

**U.S. Cl. 235—379** **10 Claims**




1. A system of payment verification for a payment document from a payor to a payee comprising:

an index code generator, for determining an index code, which uniquely identifies the payment document and serves as an index corresponding to an original data file;

a computer of the payor, operatively coupled to said index code generator, for generating said original data file using at least a payment value associated with the payment document;

a first memory, operatively coupled to said index code generator and computer, for storing said original data file;

a printer, operatively coupled to said index code generator, for imprinting said index code on the payment document;

a modem, operatively coupled to said computer of the payor, for communicating said original data file to a verification means within a computer system of a payment agent of the payor;

a second memory, operatively coupled to said verification means, for storing said communicated original data file as a verification data file;

a character reader, of the payor's agent, operatively coupled to said verification means, for reading said index code from the payment document using a code reader which is operatively coupled to said second memory; and

said verifying means adapted to verify the authenticity of the payment document by accessing said verification data file from said second memory and determining whether said read index code correctly identifies the payment document as an authorized payment document.

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**5,491,326**

**CARD METERING SYSTEM**

**Justin Marceau, Safety Harbor, and Darrell G. Rademacher, New Port Richey, both of Fla., assignors to XCP, Inc., Dryden, N.Y.**

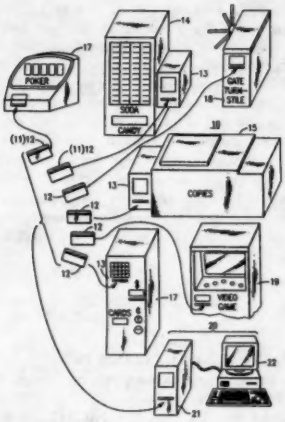
**Filed Nov. 23, 1994, Ser. No. 344,383**

**Int. Cl.[6] G06F** *7/08*

**U.S. Cl. 235—381** **5 Claims**

1. A card vending system that comprises

a plurality of vending machines each of which includes a product dispensing mechanism for dispensing to a purchaser in possession of a vend card a product selected by the purchaser; said card containing readable indicia; and a card reader mechanism into which the purchaser inserts said card to effect a purchase transaction, including means to read the indicia on said card, means to actuate said product dispensing mechanism, card controller means to interpret the indicia read from the card to ascertain the purchase credit balance available to




the purchaser in possession of the vend card and to write onto the vend card a new purchase credit balance available to said purchaser; said card reader storing transaction data for the associated vending machine, including the number of purchase transactions and money value of the transactions on said vending machine;

a plurality of meter cards each associated with a respective one of said vending machines, each said meter card being insertable into the card reader mechanism of the associated vending machine, and having recorded indicia thereon including command codes to command the card reader to write onto said meter card the transaction data stored in said card reader mechanism; and

a transaction terminal which includes computer station means for receiving, storing, processing and displaying the purchase transaction data for the vending machines in the system; and a meter card reader mechanism coupled to said computer station and into which said meter cards are inserted for transferring from the meter card to said computer station a vend machine identification code and the purchase transaction data for the vending machine associated with said meter card.

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**5,491,327**

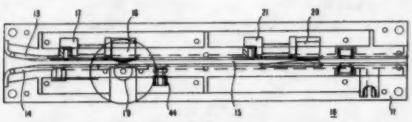
## UNIVERSAL MAGNETIC MEDIUM ENCODER WITH TILT-COMPENSATING APPARATUS

**Jagtar S. Saroya, San Pedro, Calif., assignor to American Magnetics Corporation, Torrance, Calif.**

**Filed Aug. 10, 1994, Ser. No. 288,497**

**Int. Cl.[6] G06K** *7/04;7/08*

**U.S. Cl. 235—449** **9 Claims**



1. An encoder for an encodable medium, said encoder including first and second side walls for defining a slot therebetween through which said medium can be moved by hand, each of said side walls having an aperture therethrough, said encoder including a write head extending through said aperture in said first side wall into said slot, said encoder also including a timing wheel extending through said aperture in said second side wall in a position opposing said write head, said timing wheel being mounted on a platen secured at one end thereof to said second side wall via a leaf spring having a center portion thereof of reduced width and secured at the other end thereof via a spring loaded mount thus permitting the timing wheel to move along an axis normal to the plane of said slot and to tilt to conform to any tilt angle along which said medium is moved.

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**5,491,328**

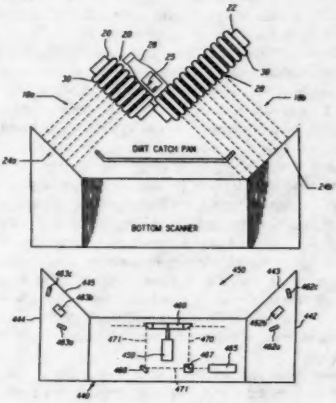
## CHECKOUT COUNTER SCANNER HAVING MULTIPLE SCANNING SURFACES

**Joseph F. Rando, Los Altos Hills, Calif., assignor to Spectra-Physics Scanning Systems, Inc., Eugene, Oreg.**

**Continuation-in-part of Ser. No. 108,112, Aug. 17, 1993, abandoned, which is a division of Ser. No. 764,527, Sep. 24, 1991, Pat. No. 5,256,864. This application Jan. 26, 1994, Ser. No. 188,164**

**Int. Cl.[6] G06K** *7/10*

**U.S. Cl. 235—462** **17 Claims**




1. A bar code scanning system for scanning items being passed through a scan volume, comprising

a conveyor for moving items through the scan volume, the conveyor defining a first surface;

a second surface disposed adjacent the first surface and arranged generally orthogonally thereto;

a first set of pattern mirrors positioned adjacent the first surface;

a second set of pattern mirrors positioned adjacent the second surface;

a mirror polygon for generating scanning beams to be passed through the first surface and the second surface; and

a motor for rotating the mirror polygon,

wherein scanning beams are passed through the conveyor for scanning a surface on an item in contact therewith.

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**5,491,329**

## PHOTODETECTING APPARATUS HAVING INTENSITY TUNEABLE LIGHT IRRADIATING UNIT

**Tsuneyuki Urakami, and Yutaka Tsuchiya, both of Hamamatsu, Japan, assignors to Hamamatsu Photonics K.K., Hamamatsu, Japan**

**Filed Dec. 2, 1994, Ser. No. 353,358**

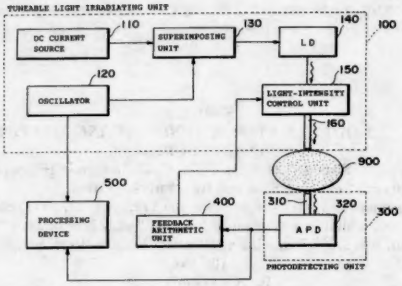
**Claims priority, application Japan, Dec. 3, 1993, 5-304311**

**Int. Cl.[6] G01J** *1/32*

**U.S. Cl. 250—205** **18 Claims**

1. A photodetecting apparatus comprising:

intensity tuneable light irradiating means for generating light to irradiate a scattering and absorption medium, an intensity of said light being modulated by a modulating signal having an ac component with a predetermined frequency, an amount of modulation of generating light or a quantity of generating light being adjustable in accordance with an external instruction;




photodetecting means for detecting an optical signal having a component with said predetermined frequency emerging from said scattering and absorption medium after said optical signal is generated from said intensity tuneable light irradiating means, irradiates said scattering and absorption medium and propagates in said scattering and absorption medium;

feedback means for receiving an optically detected signal corresponding to the intensity of said optical signal emitted from said photodetecting means, sending an instruction to said intensity tuneable light irradiating means to increase the quantity of generating light or to increase the amount of modulation of generating light when the intensity of an ac component of said optically detected signal detected by said photodetecting means is smaller than a predetermined value, and sending an instruction to said intensity tuneable light irradiating means to decrease the quantity of generating light or to decrease the amount of modulation of generating light when the intensity of the ac component of said optically detected signal detected by said photodetecting means is larger than the predetermined value; and

processing means for receiving said modulating signal and said optically detected signal and obtaining one of a timing difference between said modulating signal and said optically detected signal, and a phase difference between said modulating signal and said optically detected signal.

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**5,491,330**

**AMBIENT LIGHT DETECTOR, LASER LIGHTING CONTROL DEVICE USING THE SAME SUITABLE FOR BAR CODE READER, AND BAR CODE READER**

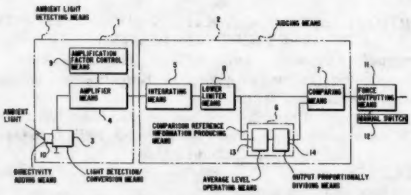
**Shinichi Sato; Toshimitsu Kumagai; Isao Iwaguchi, and Ichiro Shinoda, all of Kawasaki, Japan, assignors to Fujitsu Limited, Kawasaki, Japan**

**Filed Apr. 28, 1994, Ser. No. 234,966**

**Claims priority, application Japan, Aug. 10, 1993, 5-198675**

**Int. Cl.[6] H01J** *40/14*

**U.S. Cl. 250—214 AL** **45 Claims**




**1**. An ambient light detector comprising:

ambient light detecting means for detecting an ambient light around a device; and

judging means for providing a signal indicating that the ambient light detected by said ambient light detecting means has exceeded a predetermined value for at least predetermined time,

said ambient light detecting means including light detection/conversion means for detecting an ambient light around a device to convert the ambient light into an electrical signal, and amplifying means for amplifying the electrical signal from said light detection/conversion means,

said judging means including integrating means for integrating a signal from said amplifying means based on a predetermined time constant comparison reference information producing means for producing comparison reference information following a change in said ambient light, in response to the signal from said integrating means, and comparing means for comparing the output from said integrating means with the output from said comparison reference information producing means.

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**5,491,331**

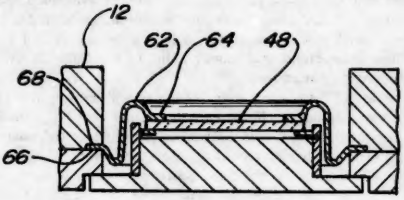
**SOFT X-RAY IMAGING DEVICE**

**Charles Armentrout, Ann Arbor, Mich., assignor to Pilot Industries, Inc., Dexter, Mich.**

**Filed Apr. 25, 1994, Ser. No. 232,839**

**Int. Cl.[6] H01J** *40/14*

**U.S. Cl. 250—214 VT** **15 Claims**




**1**. A soft x-ray imaging device comprising:

a housing defining a housing chamber,

an optic post having a planar surface and substantially transparent to visible light and an annular mating surface surrounding said planar surface,

means for securing said post to said housing so that said planar surface is positioned in said housing chamber,

means on said planar surface of said post for convening electrons to visible light,

means for transforming x-rays to electrons,

means for mounting x-ray transforming means having a first and second side within said housing chamber so that said transforming means is spaced from and parallel to said planar surface of said optic post, said mounting means comprising a ring having two spaced annular surfaces, one annular surface on said ring substantially continuously flatly abutting and supporting an outer periphery of said first side of said x-ray transforming means,

means for clamping said x-ray transforming means to said ring, said clamping means comprising an annular locking member substantially continuously flatly abutting an outer periphery of said second side of said x-ray transforming means.

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**5,491,332**

**TRANSPARENCY VIEWING APPARATUS HAVING DISPLAY AND MASKING FUNCTIONS**

**Dan Inbar, and Giora J. Teltsch, both of Haifa, Israel, assignors to A.D.P. Adaptive Visual Perception Ltd., Haifa, Israel**

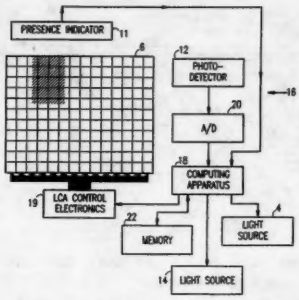
**PCT No. PCT/EP91/01310, § 371 Date Apr. 4, 1994, § 102(e) Date Apr. 4, 1994, PCT Pub. No. WO93/01564, PCT Pub. Date Jan. 21, 1993**

**PCT Filed Jun. 28, 1994, Ser. No. 175,372**

**Int. Cl.[6] G06K** *11/08;* **G02B** *27/02*

**U.S. Cl. 250—221** **43 Claims**

**1**. Apparatus having the dual function of display and optical mapping of transparencies comprising:




a viewing surface to which a transparency is adjacent;

a segmented surface underlying the viewing surface and having a plurality of segments at least two of which have a controllable opacity;

a photodetector underlying the segmented surface which detects light passing through the viewing surface and the segmented surface and generates detected light signals responsive to the intensity of the detected light, wherein the photodetector has an active area substantially smaller than the area of the viewing surface, and wherein the photodetector receives light from more than one of the plurality of segments; and

a mapping system which, in an opacity determination mode, sequentially varies of the opacity of selected segments and which determines the opacity of portions of the transparency based on signals supplied during such sequential variation.

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**5,491,333**

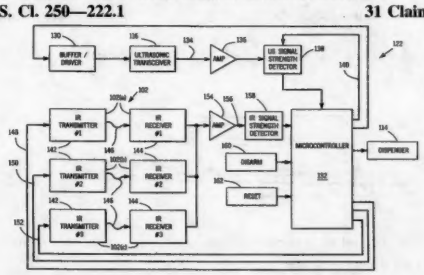
## DISPENSING METHOD AND APPARATUS THAT DETECTS THE PRESENCE AND SIZE OF A CUP AND PROVIDES AUTOMATIC FILL CONTROL

**Daniel G. Skell; Eric D. Skell, and Michael A. Manthei, all of Cedarburg, Wis., assignors to Electro-Pro, Inc., Cedarburg, Wis.**

**Continuation-in-part of Ser. No. 202,792, Feb. 28, 1994. This application Dec. 8, 1994, Ser. No. 351,840**

**Int. Cl.**[6] **G01V** *8/20;* **G01S** *7/481;17/02;* **B67D** *3/00*

**U.S. Cl. 250—222.1** **31 Claims**




1. An automatic dispenser control to detect the presence of a container, determine a container size, and automatically dispense a product according to the detected container size comprising:

at least two transmitter and receiver pairs oriented in a plane such that a transmission from a selected transmitter converges with a line of sight from a corresponding receiver at a target intercept point;

a control circuit connected to each of the transmitter and receiver pairs for activating a selected transmitter and monitoring a corresponding receiver and producing a dispense signal when the corresponding receiver senses a reflected transmission from the selected transmitter indicating the presence of a container at the target intercept point;

a dispenser connected to the control circuit for dispensing a product into the container in response to receiving the dispense signal;

a transceiver mounted adjacent to the dispenser and producing a level detection signal; and

wherein the control circuit receives the level detection signal from the transceiver and monitors a fill level of the product in the container in conjunction with activating and monitoring the transmitter and receiver pairs to determine continued container presence.

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**5,491,334**

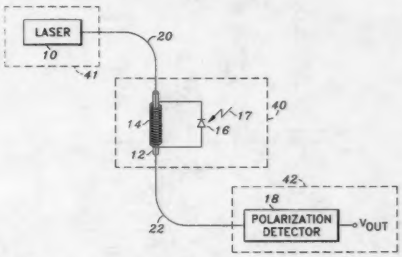
## MAGNETO-OPTICAL INPUT SYSTEM FOR INFRARED DETECTORS

**Alvin Gartenberg, Dix Hills, and David I. Durst, Syosset, both of N.Y., assignors to Grumman Aerospace Corporation, Bethpage, N.Y.**

**Filed Aug. 22, 1994, Ser. No. 294,724**

**Int. Cl.**[6] **G01J** *1/04;5/00*

**U.S. Cl. 250—227.21** **20 Claims**




1. An input circuit for receiving an output of an infrared detector element maintained in a comparatively lower temperature environment and communicating that output to associated signal processing circuitry maintained in a comparatively higher temperature environment, the infrared detector element having an electrical output thereof, the input circuit comprising:

a) a magneto-optical modulator disposed in the comparatively lower temperature environment and in direct electrical communication with the infrared detector element, said magneto-optical modulator providing an optical output to communicate a signal representative of the electrical output of said infrared detector element to the signal processing circuitry in a noise-resistant manner; and

b) wherein placing said magneto-optical modulator in direct electrical communication with the infrared detector element minimizes heat generation in the comparatively lower temperature environment so as to mitigate 1/f noise.

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**5,491,335**

## FIBER OPTIC TRANSDUCER WITH FLUID COUPLING MEANS BETWEEN OPTICAL FIBER AND TRANSDUCTION MATERIAL

**Frank Bucholtz, Crofton, Md., and James A. McVicker, Alexandria, Va., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed Aug. 31, 1994, Ser. No. 298,698**

**Int. Cl.**[6] **H01J** *5/16*

**U.S. Cl. 250—227.25** **32 Claims**

1. A fiber optic transducer comprising:

an optical fiber;

a nonlinear transduction material in which strain resulting from an applied field is a nonlinear function of the applied field; and

fluid means disposed between said optical fiber and said nonlinear transduction material and having the capability of coupling alternating mechanical strain from said nonlinear transduction material to said optical fiber while simultaneously rejecting static mechanical strain.

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**5,491,336**

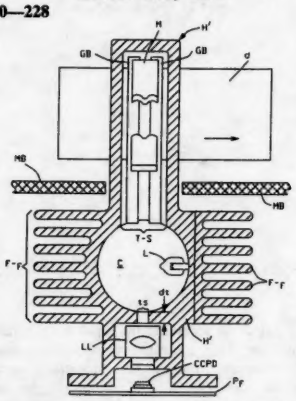
## DOCUMENT ILLUMINATION WITH LAMBERTIAN CAVITY

**David J. Concannon, Farmington Hills; Gary B. Copenhaver, Canton; Johan P. Bakker, West Bloomfield; Clive E. Catchpole, Birmingham, and John D. Vala, Plymouth, all of Mich., assignors to Unisys Corporation, Blue Bell, Pa.**

**Filed Dec. 22, 1993, Ser. No. 174,643**

**Int. Cl.[6] G01J** *1/00*

**U.S. Cl. 250—228** **38 Claims**




1. An arrangement for illuminating imaging and processing checks or like paper financial instruments in a document-processing system wherein a large number of documents are rapidly and continuously transported past one or more imaging stations, each station having a cylindrical, integrating prescribed light source means comprising an integrating structure which houses one or more cylindrical, integrating Lambertian reflecting/diffusing cavities, each cavity having one or more like light sources so that each cavity generates and projects a highly intense, highly uniform and highly diffuse beam of illumination, while incorporating imaging camera means and optical guide means to couple said illumination beam to the face of said documents at said imaging station and to couple the image of said document to said imaging camera means.

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**5,491,337**

## ION TRAP MOBILITY SPECTROMETER AND METHOD OF OPERATION FOR ENHANCED DETECTION OF NARCOTICS

**Anthony Jenkins, North Reading, and William J. McGann, Raynham, both of Mass., assignors to Ion Track Instruments, Inc., Wilmington, Mass.**

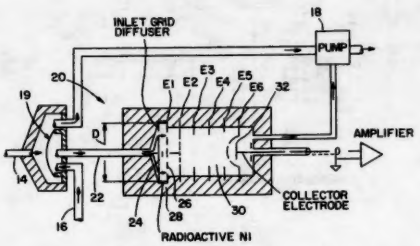
**Filed Jul. 19, 1994, Ser. No. 276,959**

**Claims priority, application United Kingdom, Jul. 15, 1994, 9414279**

**Int. Cl.[6] H01J** *49/00*

**U.S. Cl. 250—287** **20 Claims**

1. An apparatus for detecting at least one constituent of interest in a sample of air, the constituent of interest having a basicity in a known range, said apparatus comprising:




a source of a carrier gas having a basicity less than the basicity of the constituent of interest;

a source of a dopant having a basicity between the basicity of the carrier gas and the basicity of the constituent of interest;

mixing means in communication with the source of the carrier gas and the source of the dopant for adding a low concentration of the dopant to said carrier gas;

a passage in communication with said mixing means and said sample of air;

pump means in communication with the mixing means and the sample of air for creating a flowing effluent stream comprised of the carrier gas, the dopant and at least portions of the sample of air; and

an ion trap mobility spectrometer in communication with the effluent stream for detecting whether the constituent of interest is in the sample of air.

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**5,491,338**

## HIGH RESOLUTION IMAGING AND MEASURING DYNAMIC SURFACE EFFECTS OF SUBSTRATE SURFACES

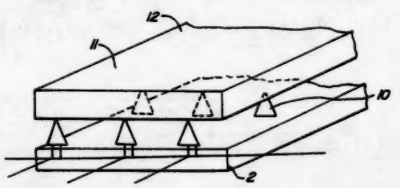
**Richard Spitzer, 1214 Oxford St., Berkeley, Calif. 94709**

**Division of Ser. No. 649,522, Feb. 1, 1991, Pat. No. 5,237,529.**

**This application Apr. 9, 1993, Ser. No. 45,563**

**Int. Cl.[6] H01J** *37/00*

**U.S. Cl. 250—307** **11 Claims**




1. A method of obtaining a high resolution image of a substrate surface comprising the steps of:

(a) positioning an array of STM probes such that said array of STM probes is stationary relative to said substrate surface during activation of said array of STM probes to obtain said image;

(b) electing-spatial points at which probes of said array of STM probes are to be activated;

(c) selecting times at which said selected STM probes are to be activated;

(d) activating said selected STM probes at said selected times; and

(e) measuring tunneling currents between said selected STM probes and said substrate.

5,491,339

## CHARGED PARTICLE DETECTION DEVICE AND CHARGED PARTICLE RADIATION APPARATUS

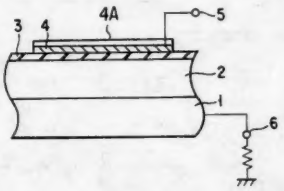
**Tadashi Mitsui, Wappingers Falls, N.Y.; Nozomu Harada, Yokohama, Japan; Motosuke Miyoshi, Tokyo, Japan; Makoto Sekine, Yokohama, Japan; Katsuya Okumura, Poughkeepsie, N.Y., and Haruo Okano, Tokyo, Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan**

**Filed Sep. 19, 1994, Ser. No. 308,420**

**Claims priority, application Japan, Sep. 21, 1993, 5-235072**

**Int. Cl.[6] H01J** *37/244*

**U.S. Cl. 250—310** **22 Claims**




1. A charge particle detection device comprising:

a semiconductor substrate;

an insulating film formed on said semiconductor substrate;

an electrode formed on said insulating film;

means for forming a potential well, which is constituted by a depletion layer in a first region of said semiconductor substrate, near a surface of said semiconductor substrate under said electrode;

means for sweeping, into a second region of said semiconductor substrate, charges which are generated in said semiconductor substrate by charged particles incident through said electrode and that are stored in said potential well; and

means for detecting electrical signals generated by the charged particles swept into said second region of said semiconductor substrate.

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5,491,340

## METHOD AND APPARATUS FOR DETERMINATION OF REFINER MECHANICAL PULP PROPERTIES

**Kari Saarinen, Vaasa, Finland, assignor to ABB Strömberg Drives OY, Helsinki, Finland**

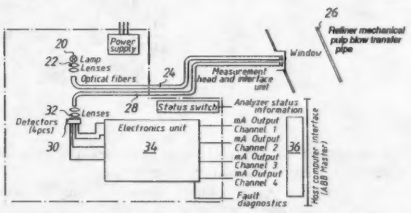
**PCT No. PCT/FI93/00023, § 371 Date Jul. 19, 1994, § 102(e) Date Jul. 19, 1994, PCT Pub. No. WO93/15389, PCT Pub. Date Aug. 5, 1993**

**PCT Filed Jan. 22, 1993, Ser. No. 256,355**

**Claims priority, application Finland, Jan. 24, 1992, 920341**

**Int. Cl.[6] D21C** *7/00;* **G01N** *21/35*

**U.S. Cl. 250—339.06** **3 Claims**




1. A method for on-stream measurement of a refiner mechanical pulp freeness comprising the following steps:

illuminating refiner mechanical pulp transported in a steam-phase carrier by electromagnetic radiation in the wavelength range of 0.1 . . . 10 μm;

measuring the change in the radiation caused by the refiner mechanical pulp;

characterized in that:

simultaneously measuring the change in the spectrum of the radiation caused by the refiner mechanical pulp at a minimum number of four different wavelength bands; and

processing the measured radiation intensity values by computational methods to obtain the freeness value.

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5,491,341

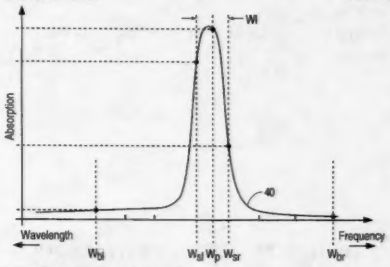
## GAS SPECTROSCOPY

**Bruce W. McCaul, 1370 Lincoln Ave., Palo Alto, Calif. 94301; David E. Doggett, Sunnyvale, Calif., and Eric K. Thorson, Snohomish, Wash., assignors to Bruce W. McCaul, Palo Alto, Calif.**

**Continuation-in-part of Ser. No. 49,474, Apr. 16, 1993. This application Apr. 15, 1994, Ser. No. 228,964**

**Int. Cl.[6] G01J** *3/42*

**U.S. Cl. 250—343** **16 Claims**




1. A method, comprising:

generating laser radiation with a laser diode and passing said laser radiation through a sample gas;

obtaining a first value indicative of a peak absorption of said laser radiation by said sample gas substantially at a peak of an absorption line of said sample gas;

obtaining a second value indicative of a line width of said absorption line; and

using said values indicative of said peak absorption and said line width to determine a third value indicative of a number of molecules of said sample gas through which said laser radiation passes, said third value being substantially independent of line-broadening effects,

wherein said generating comprises supplying said laser diode with a driving current, said driving current having a periodic waveform comprising a plurality of constant current intervals, a first, a second and a third of said constant current intervals causing said laser diode to emit laser radiation at first, second and third wavelengths respectively, said first wavelength being smaller than said second wavelength, said third wavelength being greater than said second wavelength, said second wavelength corresponding with the peak of said absorption line, the first and third wavelengths corresponding with locations on said absorption line having substantially identical absorptions.

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5,491,342

## APPARATUS AND METHOD FOR NUCLEAR CAMERA CALIBRATION

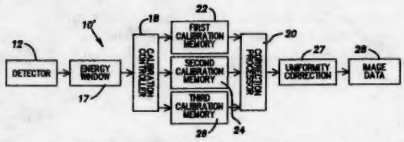
**Chun B. Lim, Moreland Hills; Barry D. Kline, Cleveland Heights; Jinghua J. Jiang, Streetsboro, and Vitaliy Rappoport, Mayfield Heights, all of Ohio, assignors to Trionix Research Laboratory, Inc., Twinsburg, Ohio**

**Filed Nov. 10, 1994, Ser. No. 338,438**

**Int. Cl.[6] G01T** *1/161;* **G12B** *13/00*

**U.S. Cl. 250—363.09** **10 Claims**

1. A method for operating a gamma camera for detecting photons of a known energy emitted from a radioisotope given to a body to be examined, said camera having a detector, said method comprising:




illuminating said detector with calibration photons having a first energy;

determining a first calibration array in response to said first energy photons;

illuminating said detector with calibration photons having a second energy different from said first energy;

determining a second calibration array in response to said second energy photons;

detecting photons from said body with said detector in an imaging array; and

correcting said imaging array in accordance with said calibration arrays.

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**5,491,343**

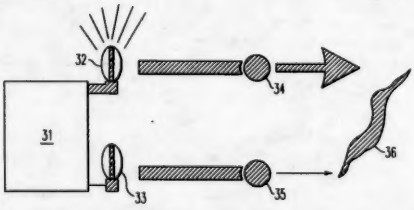
**HIGH-SPEED MULTIPLE WAVELENGTH ILLUMINATION SOURCE, APPARATUS CONTAINING THE SAME, AND APPLICATIONS THEREOF TO METHODS OF IRRADIATING LUMINESCENT SAMPLES AND OF QUANTITATIVE LUMINESCENCE RATIO MICROSCOPY**

**Gary Brooker, 9212 Bentridge Ave., Potomac, Md. 20854**

**Filed Mar. 25, 1994, Ser. No. 217,883**

**Int. Cl.[6] G01N** *21/64*

**U.S. Cl. 250—458.1** **21 Claims**




1. A vibration-free method of irradiating a sample, comprising the steps of:

(A) irradiating said sample with light having a first wavelength, a first intensity or both a first wavelength and a first intensity, by passing an electric current having a first value through a first arc and passing an electric current having a second value through a second arc, said first value being greater than said second value; and

within a period of time of from 1 nanosecond (1 ns) to 1 second (1 s) of said irradiating step (A),

(B) irradiating said sample with light having a second wavelength, a second intensity or both a second wavelength and a second intensity by reducing the value of said electric current passed through said first light source to a third value and increasing said electric current through said second light source to a fourth value, said fourth value being greater than said third value,

wherein each of said arcs has a wattage of from 10 to 2000 W.

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**5,491,344**

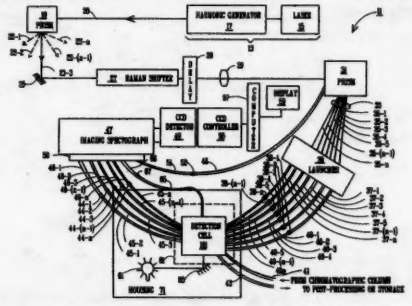
**METHOD AND SYSTEM FOR EXAMINING THE COMPOSITION OF A FLUID OR SOLID SAMPLE USING FLUORESCENCE AND/OR ABSORPTION SPECTROSCOPY**

**Jonathan E. Kenny, Lexington, Mass., and Todd A. Taylor, Chittenden, Vt., assignors to Tufts University, Medford, Mass.**

**Filed Dec. 1, 1993, Ser. No. 160,514**

**Int. Cl.[6] G01N** *21/64*

**U.S. Cl. 250—461.1** **25 Claims**




1. A method for examining the composition of a fluid or solid sample, said method comprising the steps of:

a) simultaneously illuminating the fluid or solid sample with a plurality of laser pulses of different wavelengths, each laser pulse illuminating a spatially discrete portion of the fluid or solid sample; and

b) detecting the resultant fluorescence simultaneously emitted from each of the illuminated spatially discrete portions of the fluid or solid sample.

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**5,491,345**

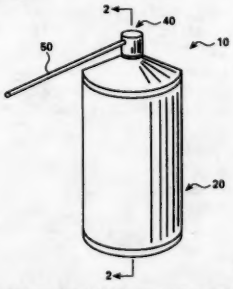
**SEALED VACUUM CANISTER AND METHOD FOR PICK-UP AND CONTAINMENT OF MATERIAL**

**Roger R. Stoutenburgh, Cutchogue, N.Y., assignor to Associated Universities, Inc., Washington, D.C.**

**Filed Oct. 3, 1994, Ser. No. 317,171**

**Int. Cl.[6] G21F** *5/00*; **B65D** *81/20*; **B67C** *3/16*

**U.S. Cl. 250—506.1** **24 Claims**




1. A vacuum canister for picking up and containing at least one of a fluid and a particulate material, comprising:

a housing with a sealed vacuum chamber having a predetermined vacuum pressure therein; and

a valve having a first port operable to be placed in fluid communication with said vacuum chamber and a second port for receiving at least one of a fluid and a particulate material, said valve being operable between a first position to seal said vacuum chamber and retain said predetermined vacuum within said vacuum chamber, and a second position to permit fluid flow through said valve from said second port into said vacuum chamber;

whereby operation of said valve, in said second position when said second port is located adjacent at least one of a fluid and a particulate material, is effective to displace through said valve the at least one of a fluid and a particulate material into said housing.

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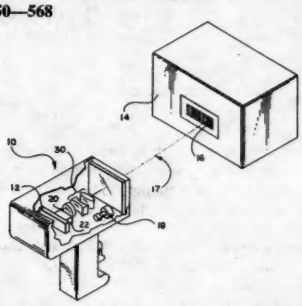
**5,491,346**

## ANAMORPHIC LENS SYSTEM FOR A HAND-HELD SYMBOLOGY READER

**John W. Sussmeier, Wappingers Falls, N.Y., assignor to United Parcel Service of America, Inc., Atlanta, Ga.**

**Filed Oct. 24, 1994, Ser. No. 327,970**
**Int. Cl.[6] G06K** *7/10*
**U.S. Cl. 250—568** **20 Claims**




**19**. A symbology reader for detecting a coded symbol on an object, the coded symbol requiring at least a first predetermined object resolution along a vertical plane; the reader comprising:

a two-dimensional array CCD sensor, the CCD sensor defining a horizontal sensor resolution and a vertical sensor resolution, the horizontal sensor resolution being greater than the vertical sensor resolution;

an optical system designed to focus rays from the symbol onto the CCD sensor;

the CCD sensor and the optical system being configured such that when the reader is positioned within a predetermined range of distance from the object, the CCD sensor projects from the symbol through the optical system (1) a vertical object resolution no less than the first predetermined vertical object resolution, (2) a horizontal object resolution, and (3) a horizontal object size; and

an anamorphic lens system configured to be interposed between the CCD sensor and the symbol, the anamorphic lens system designed to increase the horizontal object size projected to the CCD sensor and thereby decrease the horizontal object resolution while maintaining the vertical object resolution at no less than the first predetermined vertical object resolution.

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**5,491,347**

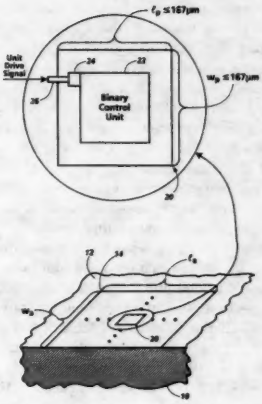
## THIN-FILM STRUCTURE WITH DENSE ARRAY OF BINARY CONTROL UNITS FOR PRESENTING IMAGES

**Robert R. Allen, deceased, late of San Francisco; Richard H. Bruce, Los Altos; Tzu-Chin Chuang, Saratoga; Thomas G. Fiske, Campbell; Ronald T. Fulks; Michael Hack, both of Mountain View; Jackson H. Ho, Palo Alto; Alan G. Lewis, Sunnyvale; Russel A. Martin, Menlo Park, all of Calif.; Louis D. Silverstein, Scottsdale, Ariz.; Hugo L. Steemers, Palo Alto, Calif.; Susan M. Stuber, Redwood City, Calif.; Malcolm J. Thompson, Palo Alto, Calif.; William D. Turner, San Marino, Calif., and William W. Yao, Los Altos, Calif., assignors to Xerox Corporation, Stamford, Conn.**

**Filed Apr. 28, 1994, Ser. No. 235,011**
**Int. Cl.[6] H01L** *33/00*
**U.S. Cl. 257—59** **19 Claims**

**1**. A product comprising:

a substrate that has a surface; and




a thin-film structure formed at the surface of the substrate; the thin-film structure comprising:

an array of binary control units for causing presentation of images; each binary control unit having a lead for receiving a unit drive signal; each binary control unit responding to its unit drive signal by causing presentation of a segment of images presented by the array; each binary control unit being able to present a segment with either of first and second colors, each binary control unit's first color having a maximum intensity the binary control unit can provide, each binary control unit's second color having a minimum intensity the binary control unit can provide; each binary control unit's unit drive signal causing the binary control unit to present its first and second colors;

the array extending in first and second directions that are perpendicular; the binary control units in the array having densities in the first and second directions that are both greater than 60/cm; the array having an area large enough to present images for direct viewing.

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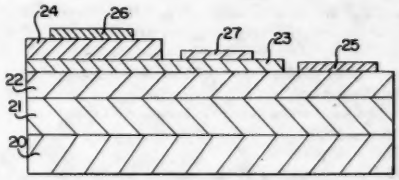
**5,491,348**

## HIGHLY-ORIENTED DIAMOND FILM FIELD-EFFECT TRANSISTOR

**Hisasi Koyamao; Koichi Miyata, both of Kobe; Kimitsugu Saito, Tarumi, all of, Japan; David L. Dreifus, and Brian R. Stoner, Raleigh, both of N.C., assignors to Kobe Steel USA, Inc., Research Triangle Park, N.C.**

**Continuation of Ser. No. 61,857, May 14, 1993, abandoned.**
**This application Sep. 28, 1994, Ser. No. 313,986**
**Int. Cl.[6] H01L** *29/04*
**U.S. Cl. 257—66** **6 Claims**




**1**. A highly-oriented diamond film field-effect transistor, comprising;

a source electrode,

a drain electrode,

a gate electrode,

a first semiconducting diamond film connected to said source electrode,

a second semiconducting diamond film connected to said drain electrode and having the same conductivity type as said first semiconducting diamond film,

a highly resistant diamond film connected to said gate electrode and positioned between said first and second semiconducting diamond films, said highly resistant diamond film having a thickness in a direction between said first and second semiconducting diamond films of 10 Å to 1 mm and an electrical resistance of $10^2$ Ω.cm or more,

a channel region being defined within said highly resistant diamond film, said channel region connecting said first and second semiconducting diamond films, and

at least part of said first and second semiconducting diamond films and said highly resistant diamond film being made of a highly-oriented diamond film in which at least 80% of a film surface consists of a plurality of diamond crystals with (**100**) crystal planes, and the differences {Δα, Δβ, Δτ} of the Euler angles {α, β, τ}, which represent the orientations of the crystals with the (**100**) crystal planes, satisfy $|\Delta\alpha| \leqq 10°$, $|\Delta\beta| \leqq 10°$, and $|\Delta\tau| \leqq 10°$ between adjacent (**100**) crystal planes.

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**5,491,349**

**MULTI-COLOR LIGHT EMITTING DEVICE**

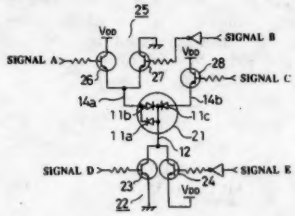
**Satoshi Komoto, Tokyo; Hiroshi Nagasawa, Yokohama, and Hitoshi Kawasaki, Kawasaki, all of, Japan, assignors to Kabushiki Kaisha Toshiba, Kawagawa, Japan**

**Division of Ser. No. 897,742, Jun. 12, 1992, Pat. No. 5,324,962. This application Apr. 22, 1994, Ser. No. 231,486**

**Claims priority, application Japan, Jun. 13, 1991, 3-141799**

**Int. Cl.[6] H01L** *33/00*

**U.S. Cl. 257—88** **12 Claims**




1. A semiconductor light emitting device having a plurality of light emitting diodes, each of which is driven separately, the device comprising:

at least three light emitting diodes in which at least one pair of light emitting diodes connected parallel in the reverse direction is included;

a common terminal in which each one of the electrodes of all the said light emitting diodes is commonly connected with;

at least one first terminal in which the other electrodes of said diode pair are commonly connected with;

at least one second terminal which is connected with the rest electrode of said light emitting diode, which is not included in said diode pair;

a power source whose voltage is enough for driving said light emitting diodes;

a low electric power source;

at least three switching means, each of which is respectively connected with one of said first, second, and common terminal so as to connect either one of said two power sources with said diodes; and

means for controlling said switching means such that the power sources connected with said first terminal and said common terminal are different for each other and the power sources connected with said second terminal and said common terminal are different for each other.

**5,491,350**

**LIGHT EMITTING DIODE AND PROCESS FOR FABRICATING THE SAME**

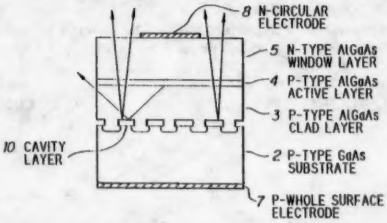
**Tsunehiro Unno, and Taichiro Konno, both of Ibaraki, Japan, assignors to Hitachi Cable Ltd., Tokyo, Japan**

**Filed Jun. 30, 1994, Ser. No. 268,644**

**Claims priority, application Japan, Jun. 30, 1993, 5-160610; Nov. 17, 1993, 5-287987**

**Int. Cl.[6] H01L** *33/00;27/15;31/12*

**U.S. Cl. 257—99** **12 Claims**


8 N-CIRCULAR ELECTRODE
5 N-TYPE AlGaAs WINDOW LAYER
4 P-TYPE AlGaAs ACTIVE LAYER
3 P-TYPE AlGaAs CLAD LAYER
10 CAVITY LAYER
2 P-TYPE GaAs SUBSTRATE
7 P-WHOLE SURFACE ELECTRODE

1. A light emitting diode which is formed with a plurality of epitaxial layers defining a light emitting portion on a substrate, comprising: a column-shaped mesa portion providing cavities on a surface of said substrate, said epitaxial layers being partially connected with said substrate by said column-shaped mesa portion; and a cavity layer formed between said substrate and said epitaxial layers at said cavities except for said column-shaped mesa portion, said cavity layer reflecting light emitted from said light emitting portion to said substrate to propagate light in a direction away from said substrate.

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**5,491,351**

**GATE TURN-OFF THYRISTOR**

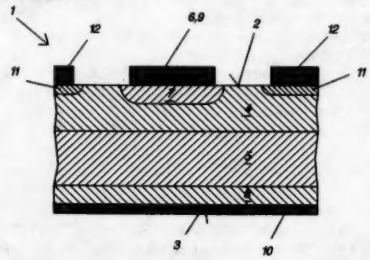
**Friedhelm Bauer, Ittigen, and Peter Streit, Widen, both of, Switzerland, assignors to ABB Management AG, Baden, Switzerland**

**Filed Oct. 27, 1994, Ser. No. 330,189**

**Claims priority, application Germany, Jan. 30, 1993, 43 37 209.0**

**Int. Cl.[6] H01L** *29/74;29/50;29/60*

**U.S. Cl. 257—152** **20 Claims**




1. A turn-off power semiconductor component comprising:

a cathode-side and a anode-side main surface;

a sequence of differently doped layers which are arranged between the cathode-side and the anode-side main surface, said sequence comprising, starting from the cathode-side main surface: a p-base, an n-base, and a p-doped anode emitter;

said component further comprising, on the cathode-side main surface, a cathode and, on the anode-side main surface, an anode; said cathode being formed by a multiplicity of n-doped cathode emitter regions recessed in the p-base and being covered by a metal layer, and said anode being formed by said p-emitter covered by a metal layer;

wherein said cathode emitter regions have a penetration depth of less than or equal to 2 μm and a doping rate with an edge concentration of less than or equal to $10^{19}$ $cm^{-3}$.

## 5,491,352
## SEMICONDUCTOR DEVICE HAVING PERIPHERAL METAL WIRING

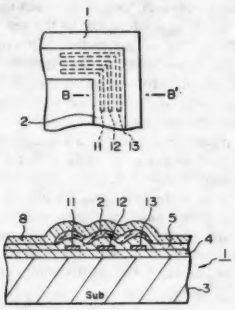
**Nobuaki H. Tsuji, Hamamatsu, Japan, assignor to Yamaha Corporation, Hamamatsu, Japan**

**Division of Ser. No. 910,624, Jul. 8, 1992, Pat. No. 5,391,920. This application Oct. 6, 1994, Ser. No. 319,140**

**Claims priority, application Japan, Jul. 9, 1991, 3-168508; Sep. 11, 1991, 3-232016**

**Int. Cl.[6] H01L** *23/485;29/40*

**U.S. Cl. 257—207** **18 Claims**




1. A semiconductor device having at least one transistor including a gate electrode comprising a first material, comprising:

(a) a semiconductor substrate on which the device is provided;

(b) a first conductive layer having a plurality of conductive lines provided in spaced parallel relationship above a peripheral region of the semiconductor substrate, each of the plurality of conductive lines including the first material, the plurality of conductive lines extending lengthwise in parallel along a first direction;

(c) an insulating layer formed over the first conductive layer, the insulating layer having a corrugated surface caused by the plurality of conductive lines; and

(d) a second conductive layer formed on the insulating layer, the second conductive layer having a corrugated surface transferred from the insulating layer, the second conductive layer having a length greater than a width, the length of the second conductive layer extending along the first direction above the plurality of conductive lines of the first conductive layer.

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## 5,491,353
## CONFIGURABLE CELLULAR ARRAY

**Thomas A. Kean, Edinburgh, Scotland, assignor to Xilinx, Inc., San Jose, Calif.**

**Continuation of Ser. No. 116,395, Sep. 3, 1993, abandoned, which is a division of Ser. No. 761,835, Sep. 13, 1991, Pat. No. 5,243,238. This application Mar. 31, 1995, Ser. No. 416,434**

**Claims priority, application United Kingdom, Mar. 17, 1989, 8906145**

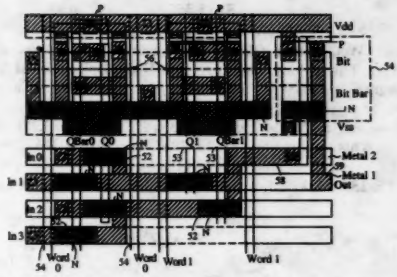
**Int. Cl.[6] H01L** *27/04;23/50*

**U.S. Cl. 257—208** **9 Claims**

1. A configurable cellular array integrated circuit having a substrate with a length and a width, p-type and n-type diffusion zones thereon, a deposited layer of polysilicon, and first and second metal layers,

wherein the polysilicon layer forms a first series of parallel strips extending across the length of the substrate in a first direction, and a second series of parallel strips extending across less than the length of the substrate in the first direction:

the second metal layer forms strips extending in a second direction orthogonal to the first direction, a first strip, being one of the strips extending in the second direction, extending across the width of the substrate:




the first metal layer forms a plurality of strips wherein at least one strip of the plurality of strips extends in the first direction and at least one other strip of the plurality of strips extends in the second direction:

the p-type and n-type zones form strips extending substantially in the first direction; and

further comprising an associated RAM cell which is formed in one part of the circuit, the associated RAM cell being coupled to at least one of the first series of parallel strips to receive an access signal and being coupled to the first strip to receive a programming signal, the associated RAM cell being further coupled to one of the second series of parallel strips to provide a control signal to a switch.

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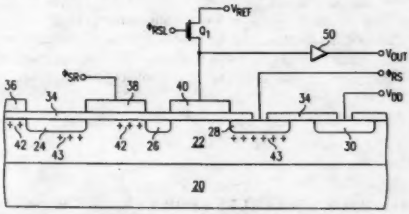
## 5,491,354
## FLOATING GATE CHARGE DETECTION NODE

**Jaroslav Hynecek, Richardson, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.**

**Filed Aug. 19, 1994, Ser. No. 297,460**

**Int. Cl.[6] H01L** *29/816;* **G11C** *19/28*

**U.S. Cl. 257—239** **6 Claims**




1. A charge coupled device charge detection node comprising:

a first semiconductor layer of a first conductivity type;

a second semiconductor layer of a second conductivity type in the substrate;

virtual gate regions of the first conductivity type formed in the second semiconductor layer, the virtual gate regions forming virtual phase potential areas;

an insulating layer on the second semiconductor layer;

a floating gate formed on the insulating layer, the floating gate is located above a portion of the second semiconductor layer that is between virtual gate regions, the floating gate forming a floating gate potential well in response to a voltage;

a first transfer gate formed on the insulating layer and separated from the floating gate by a virtual gate region, the first transfer gate forming a transfer potential area in response to a voltage; and

an electrode coupled to one of the virtual gate regions on the opposite side of the floating gate from the first transfer gate, the electrode increases the potential of the virtual phase potential area below the electrode in response to a voltage.

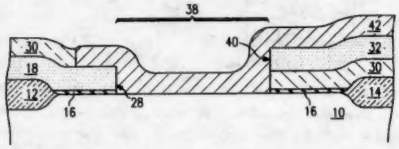
## 5,491,355
## SELF-ALIGNED CONTACT FORMATION

**Che C. Wei, Plano; Chiara Zaccherini, Dallas; Robert O. Miller, The Colony, and Girish A. Dixit, Dallas, all of Tex., assignors to SGS-Thomson Microelectronics, Inc., Carrollton, Tex.**

**Division of Ser. No. 939,951, Sep. 3, 1992, Pat. No. 5,278,098. This application Jul. 23, 1993, Ser. No. 97,366**

**Int. Cl.[6] H01L** *29/04*

**U.S. Cl. 257—754** **10 Claims**




1. An integrated circuit structure, comprising:

a device layer having conducting regions therein;

an insulating layer over said device layer, said insulating layer having openings therein which expose selected conducting regions therethrough, wherein the openings have sidewalls;

a patterned polycrystalline silicon interconnect layer overlying said insulating layer and having portions adjacent the insulating layer openings, wherein the patterned polycrystalline silicon interconnect layer has a top and sides, and wherein the adjacent portions have a sidewall aligned with an opening sidewall and are separated from the conducting regions by said insulating layer;

metallic conducting regions in contact with and covering the top and sides of said interconnect layer, wherein said metallic conducting regions adjacent the insulating layer openings extend into and cover such openings, and wherein said interconnect layer and said metallic conducting regions define conductive signal lines;

a lower insulating layer between said device layer and said insulating layer; and

a lower patterned polycrystalline silicon interconnect layer between said lower insulating layer and said insulating layer;

wherein portions of said lower interconnect layer are also exposed in the insulating layer openings, whereby said metallic conducting regions which extend into the openings also make contact with the lower interconnect layer exposed portions.

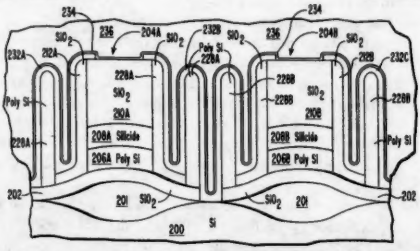
## 5,491,356
## CAPACITOR STRUCTURES FOR DYNAMIC RANDOM ACCESS MEMORY CELLS

**Charles Dennison, and Pierre Fazan, both of Boise, Id., assignors to Micron Technology, Inc., Boise, Id.**

**Continuation-in-part of Ser. No. 599,624, Nov. 19, 1990, abandoned. This application Nov. 15, 1993, Ser. No. 153,124**

**Int. Cl.[6] H01L** *27/108;29/76;29/94;31/119*

**U.S. Cl. 257—306** **23 Claims**




1. A capacitor structure for use on an integrated circuit dynamic random access memory having first and second word lines and first and second parallel digit lines, the integrated circuit being fabricated on a semiconductor substrate, the capacitor structure comprising:

first spacer means for supporting a subsequently formed layer, the first spacer means comprising at least first and second sides, the first spacer means being immediately adjacent to the first digit line;

second spacer means for supporting a subsequently formed layer, the second spacer means comprising at least first and second sides, the second spacer means being immediately adjacent to the second digit line;

a first capacitor plate layer formed on at least a first side of the first spacer means and a first side of the second spacer means and at least a portion of any surface adjoining therebetween;

a dielectric layer formed over the first capacitor plate;

a second capacitor plate formed on the dielectric layer, the sides of the first and second spacer means supporting at least part of the capacitor structure on the integrated circuit; and

a third spacer means for supporting a subsequently formed layer, the third spacer means comprising at least first and second sides and positioned between the first and second spacer means and wherein the first capacitor plate layer is formed on the first and second sides of the third spacer means and at least a portion of any surface adjoining between the third spacer means and the first and second spacer means, wherein the capacitor structure has a maximum of two capacitor plates.

## 5,491,357
## INTEGRATED STRUCTURE CURRENT SENSING RESISTOR FOR POWER MOS DEVICES, PARTICULARLY FOR OVERLOAD SELF-PROTECTED POWER MOS DEVICES

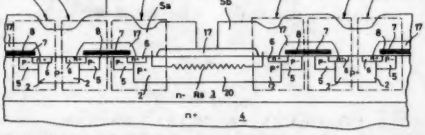
**Raffaele Zambrano, Catania, Italy, assignor to Consorzio Per La Ricerca Sulla Microelettronica Nel Mezzogiorno, Catania, Italy**

**Continuation of Ser. No. 242,261, May 13, 1994, abandoned. This application Jun. 7, 1995, Ser. No. 481,198**

**Claims priority, application European Pat. Off., May 19, 1993, 93830207**

**Int. Cl.[6] H01L** *27/04;27/08*

**U.S. Cl. 257—337** **33 Claims**




1. An integrated structure current sensing resistor for a power MOS device comprising a main power device and a current sensing device respectively made up of a first plurality of a second plurality of identical cells arranged in an array, each of them comprising a deep body region of a first conductivity type obtained in a semiconductor material of a second conductivity type, a lateral channel region of said first conductivity type and a source region of said second conductivity type extending partially in said deep body region and partially in said lateral channel region, an conductive gate layer, insulated from a top surface of the semiconductor material by a thin gate oxide layer superimposed over said channel region, the deep body region and the source region of each cell of the first plurality being electrically connected to each other, and the deep body region and the source region of each cell of the second plurality being electrically connected to each other, by means of respective first and second superimposed conductive source electrodes, characterized in that said integrated structure sensing resistor is formed in at least one doped region which is an interconnecting portion integrally coupled to the deep body region of at least one cell of the first plurality and of the deep body region of a corresponding cell of the second plurality, said sensing resistor having a first end contacted by said first source electrode through a

same contact opening through which the first source electrode contacts the source and deep body regions of said at least one cell of the first plurality and a second end contacted by said second source electrode through a same contact opening through which the second source electrode contacts the source and deep body regions of said corresponding cell of the second plurality.

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**5,491,358**

## SEMICONDUCTOR DEVICE HAVING AN ISOLATING PORTION BETWEEN TWO CIRCUIT REGIONS

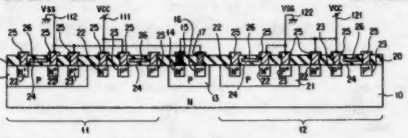
**Haruyuki Miyata, Yokohama, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan**

**Continuation of Ser. No. 271,650, Jul. 7, 1994, abandoned. This application Jun. 7, 1995, Ser. No. 479,830**

**Claims priority, application Japan, Jul. 9, 1993, 5-170058**

**Int. Cl.[6] H01L** *29/784*

**U.S. Cl. 257—546** **11 Claims**



**1**. A semiconductor device comprising:

a semiconductor substrate of a first conductivity type;

a first circuit region containing elements to form a digital circuit and a second circuit region containing elements to form an analog circuit, said first and second circuit regions formed on said semiconductor substrate;

a well region of a second conductivity type opposite to the first conductivity type, formed on said semiconductor substrate and between said first circuit region and said second circuit region;

a first diffusion layer of the first conductivity type, formed on said well region, said first diffusion layer and said well region constituting a passive element;

a first electrode formed in contact with said first diffusion layer;

a second diffusion layer of the second conductivity type, formed on said well region and spaced apart from said first diffusion layer; and

a second electrode formed in contact with said second diffusion layer.

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**5,491,359**

## MICROCOMPUTER WITH HIGH DENSITY RAM IN SEPARATE ISOLATION WELL ON SINGLE CHIP

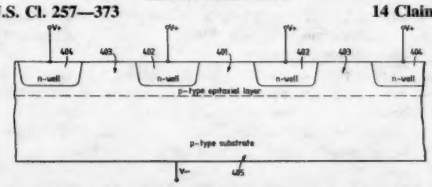
**Michael D. May; Jonathan Edwards, both of Bristol, and David L. Waller, Kent, all of, England, assignors to INMOS Limited, Bristol, England**

**Division of Ser. No. 606,064, Oct. 30, 1990, Pat. No. 5,243,698, which is a division of Ser. No. 938,380, Dec. 9, 1986, Pat. No. 4,967,326, which is a continuation of Ser. No. 553,027, Nov. 16, 1983, abandoned. This application May 24, 1993, Ser. No. 66,489**

**Claims priority, application United Kingdom, Nov. 26, 1992, 8233733**

**Int. Cl.[6] H01L** *29/76*

**U.S. Cl. 257—373** **14 Claims**




**1**. An integrated circuit chip comprising an on-chip logic circuitry and an on-chip writable memory on a single integrated circuit chip having a substrate of semiconductor material of a first type, wherein said on-chip writable memory comprises a high density array of memory cells having at least one K bytes of storage, said integrated circuit chip including

(a) memory array access circuitry on said chip;

(b) a plurality of additional on-chip transistors comprising circuitry operable independently of the operation of said memory array;

(c) a first isolation region on said chip, said first isolation region containing all of said memory cells of said high density memory array;

(d) a second isolation region on said chip separate from said first isolation region, said second isolation region containing some of said additional transistors which are operable independently of said operation of said memory array, and

(e) an isolation interface between said first and second isolation regions, said second isolation region being located adjacent said isolation interface, whereby said high density memory array is located on the same chip as said independently operating additional transistors and is protected from noise due to independent operation of said additional transistors.

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**5,491,360**

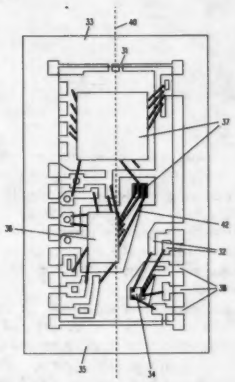
## ELECTRONIC PACKAGE FOR ISOLATED CIRCUITS

**Peng-Cheng Lin, Cupertino, Calif., assignor to National Semiconductor Corporation, Santa Clara, Calif.**

**Filed Dec. 28, 1994, Ser. No. 364,700**

**Int. Cl.[6] H01L** *23/48;29/44;29/52;29/60*

**U.S. Cl. 257—672** **18 Claims**




**1**. A dual in-line type package comprising:

(a) a primary circuit and a secondary circuit isolated from the primary circuit;

(b) a lead frame assembly having a plurality of leads, a first end of each lead being electrically coupled to an associated circuit component in an associated one of the primary and secondary circuits;

(c) an encapsulating material molded over the circuit components and an inner portion of the lead frame to form an exterior protective package, the exterior protective package having opposing first and second sides, opposing first and second ends, and a longitudinal center line between the first and second sides, wherein the leads have exterior pin portions that extends outside of the protective package along the first and second sides of the protective package, there being a first side end pin portion that defines the pin portion extending from the first side of the protective package that is closest to the first end of the protective package and there being a second side end pin portion that defines the pin portion extending from the second side of the protective package that is closest to the first end of the protective package, the first side end pin portion being associated with the primary circuit

and the second side end pin portion being associated with the secondary circuit; and

(d) a tie bar connected to a portion of the lead frame that is associated with the secondary circuit, the tie bar being exposed on the first end of the exterior protective package and being positioned off-center relative to the longitudinal center line of the package such that the distance between the tie bar and the first side end pin portion is greater than one half the width of the package;

wherein the tie bar is arranged for connecting to a side rail external to the package to support the lead frame during manufacturing.

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**5,491,361**

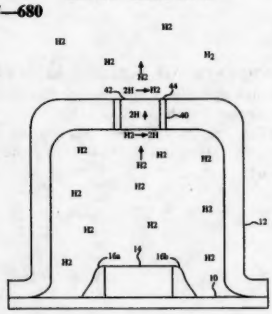
**HYDROGEN OUT VENTING ELECTRONIC PACKAGE**

**Gary W. Stupian, Hermosa Beach, and Martin S. Leung, Redondo Beach, both of Calif., assignors to The Aerospace Corporation, El Segundo, Calif.**

**Filed Oct. 14, 1994, Ser. No. 324,070**

**Int. Cl.[6] H01L** *23/02*

**U.S. Cl. 257—680** **10 Claims**



1. An electronic package having an interior cavity for containing at least one electronic device and having an exterior space, said cavity capable of trapping molecular hydrogen therein, said package comprising

a wall defining said cavity and separating said cavity from said exterior space, said at least one electronic device disposed on an interior surface of said wall within said cavity of said package, and

a hydrogen window means having an interior surface exposed to said cavity and an exterior surface exposed to said exterior space, said interior surface dissociating said molecular hydrogen into atomic hydrogen, said hydrogen window means for diffusing said atomic hydrogen from said interior surface to said exterior surface there recombining said atomic hydrogen back into molecular hydrogen and out venting said molecular hydrogen into said exterior space.

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**5,491,362**

**PACKAGE STRUCTURE HAVING ACCESSIBLE CHIP**

**Ahmad Hamzehdoost, Sacramento, and Leonard L. Mora, San Jose, both of Calif., assignors to VLSI Technology, Inc., San Jose, Calif.**

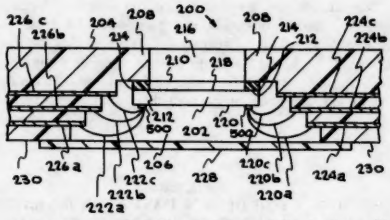
**Continuation of Ser. No. 876,249, Apr. 30, 1992. This application Aug. 13, 1993, Ser. No. 106,146**

**Int. Cl.[6] H01L** *23/48;23/02;25/04;29/44*

**U.S. Cl. 257—712** **15 Claims**

13. An integrated-circuit package structure for housing and exposing an integrated-circuit die comprising:

an integrated-circuit die having front and back surfaces, said front surface having wire-bonding pads peripherally disposed thereon, said back surface having a mounting area peripherally located thereon,



a package body having a die cavity formed therein for receiving said integrated-circuit die, said package body having a ring portion formed therein adjacent to said die cavity, wherein said ring portion extends from said package body into said die cavity, said ring portion including an integrated-circuit die mounting surface to which said mounting area on said back surface of said integrated-circuit die is fixed such that said integrated-circuit die is secured within said die cavity in a die-down configuration with said back surface of said integrated-circuit die exposed thereby allowing direct cooling of said exposed back surface of said integrated-circuit die,

ambient air contacting said exposed back surface of said integrated-circuit die, thereby providing cooling to said die; and

bonding wires connected between said wire-bonding pads peripherally located on said front surface of said integrated circuit die and lead fingers of a leadframe for said integrated-circuit package assembly.

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**5,491,363**

**LOW BOILING POINT LIQUID COOLANT COOLING STRUCTURE FOR ELECTRONIC CIRCUIT PACKAGE**

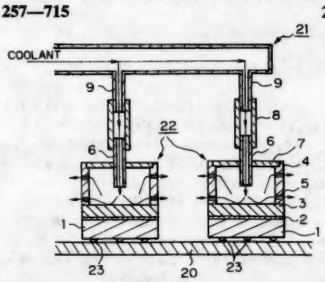
**Minoru Yoshikawa, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan**

**Continuation of Ser. No. 11,775, Feb. 1, 1993, abandoned. This application Mar. 1, 1995, Ser. No. 396,900**

**Claims priority, application Japan, Feb. 10, 1992, 4-023052; Jun. 24, 1992, 4-165768**

**Int. Cl.[6] H05K** *7/20;* **H01L** *23/34;* **F28F** *7/00*

**U.S. Cl. 257—715** **20 Claims**




1. A cooling structure for cooling an electronic circuit package using liquid coolant having a low boiling point which can remove heat by vaporization of said liquid coolant, comprising:

a tubular fin member made of a material having high heat conductivity and having a plurality of through-holes of small diameter formed therein;

a flat plate member made of a material having high heat conductivity and having a pair of surfaces, a first one of said surfaces being joined to one end of said tubular fin member to close one end of said fin member, and a second one of said surfaces being capable of being affixed to the electronic circuit package;

a lid member being attached to the other end of said fin member; and

a pipe member extending through said lid member so that an outlet at one end thereof is located adjacent said first surface of said flat plate member;

wherein the liquid coolant being supplied into said pipe member by way of the other end of said pipe member directly collides against said first surface of said flat plate member and is subsequently forced out through said through-holes in an evaporated state.

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**5,491,364**

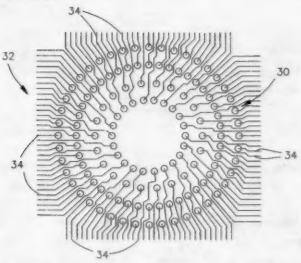
**REDUCED STRESS TERMINAL PATTERN FOR INTEGRATED CIRCUIT DEVICES AND PACKAGES**

**Scott D. Brandenburg; William S. Murphy, both of Kokomo; Ahmer R. Syed, Carmel; David A. King, Kokomo, all of Ind., and Shing Yeh, Buffalo Grove, Ill., assignors to Delco Electronics Corporation, Kokomo, Ind.**

**Filed Aug. 31, 1994, Ser. No. 299,924**

**Int. Cl.[6] H01L** *23/50*

**U.S. Cl. 257—786** **17 Claims**




**1**. A terminal pattern for an integrated circuit device, the terminal pattern comprising terminals arranged in concentric arrays, each array having a substantially circular shape and comprising a plurality of the terminals, the plurality of terminals being interconnected with conductors of a single layer conductor pattern such that the conductors extend radially outward relative to the terminal pattern, wherein the terminal pattern has a smaller maximum width than a rectangular terminal pattern for an integrated circuit device having the same number of terminals, whereby after soldering the integrated circuit device to the conductors to form solder joints therebetween with the terminals, the solder joints will exhibit reduced shear strain, resulting in improved fatigue life for the solder joints as compared to that possible for the rectangular terminal pattern.

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**5,491,365**

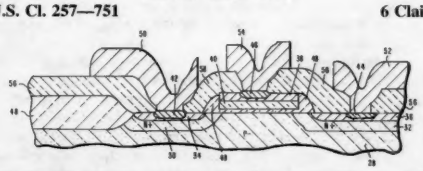
**SELF-ALIGNED ION IMPLANTED TRANSITION METAL CONTACT DIFFUSION BARRIER APPARATUS**

**Maw-Rong Chin; Gary Warren, both of Huntington Beach, and Kuan-Yang Liao, Laguna Niguel, all of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.**

**Division of Ser. No. 39,718, Mar. 29, 1993, Pat. No. 5,389,575, which is a continuation-in-part of Ser. No. 729,243, Jul. 12, 1991, abandoned. This application Nov. 18, 1994, Ser. No. 341,795**

**Int. Cl.[6] H01L** *29/40*

**U.S. Cl. 257—751** **6 Claims**



**1**. A contact structure to a semiconductor material, comprising:

a layer of a silicide of a first transition metal formed over said semiconductor material,

an insulating layer over said layer of silicide wherein said insulating layer has an opening therein,

a conductive contact extending through said opening, and

a layer of contact diffusion barrier material interposed between said contact and a portion of said layer of silicide substantially only in the immediate vicinity of said opening wherein said barrier layer is set into said layer of silicide and the thickness of said layer of silicide lateral to said opening is substantially equal to the combined thickness of said layer of silicide and said barrier layer in the immediate vicinity of said opening, and said layer of barrier material comprises the material formed by implanting a second transition metal into said layer of silicide.

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**5,491,366**

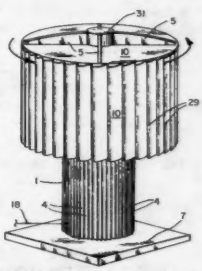
**LEAK PREVENTION IN UNDERWATER POWER GENERATION**

**Edwin Newman, 10331 Lindley Ave. #113, Northridge, Calif. 91326**

**Filed Feb. 28, 1994, Ser. No. 202,993**

**Int. Cl.[6] F03B** *13/10*

**U.S. Cl. 290—53** **6 Claims**




**1**. A system for generating electric power from the motion of underwater currents, the system comprising:

a. a tower having multiple telescopeable portions adapted to support a large external structure underwater;

b. a bag which is large and cylindrically shaped and supported centrally and underneath by said tower, said bag being internally stiffened by compressed water to maintain it's shape and configured to produce rotational motion and vertical motion with respect to said tower when impacted by the moving mass of water which surrounds said bag;

c. means interconnecting said tower and bag permitting said bag to move with respect to a moveable section of said tower;

d. single generator means mounted within said tower to convert horizontal motion of said bag to electric power; and

e. an air pocket defined by the inner core walls of said bag and on it's bottom by a new water surface itself defined on it's outer edge by the inner walls of said bag to contain said generator in an air environment above said new water surface and support a moveable portion of said telescopeable tower.

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**5,491,367**

**TRANSITION TIME CONVERTER**

**Peter Schinzel, Boeblingen, Germany, assignor to Hewlett-Packard Company, Palo Alto, Calif.**

**Filed Apr. 28, 1993, Ser. No. 53,533**

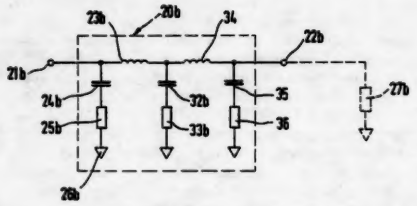
**Claims priority, application European Pat. Off., May 26, 1992, 92108821**

**Int. Cl.[6] H03K** *3/013*

**U.S. Cl. 307—106** **11 Claims**

**1**. In combination,

a source of pulses having transitions with steep slopes having certain frequency components, the source having a predeter-




mined output impedance, $R_Z$, between a signal output terminal thereof and a reference potential terminal,

a load having a predetermined impedance between a pair of load terminals, one of the load terminals being connected to the reference potential terminal, the other load terminal being a signal terminal, the predetermined load impedance being equal in value to $R_Z$,

a transition time converter network connected between the signal terminals of the source and load, the transition time converter network having series and shunt branch means including opposite type reactance components (a) connected to (i) each other, (ii) the signal output terminal of the source, (iii) the reference potential terminal and (iv) the signal terminal of the load and (b) with inductive, capacitive and resistive values so: (i) the transitions having steep slopes are coupled to the load as transitions with considerably reduced slopes, (ii) there is no substantial coupling of reflections from the matching network to the source of pulses via the signal output terminal in response to the source deriving the transitions with the steep slopes and (iii) the impedance seen by the source looking into the network via the signal output terminal is equal substantially to $R_Z$ for the certain frequency components in the transitions having the steep slopes.

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**5,491,368**

**POWER FEED PATH SWITCHING CIRCUIT**

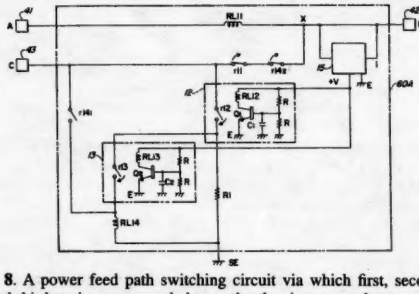
**Hiroshi Yamamoto, Kawasaki, Japan, assignor to Fujitsu Limited, Kawasaki, Japan**

**Filed Apr. 13, 1993, Ser. No. 46,994**

**Claims priority, application Japan, Apr. 15, 1992, 4-095457**

**Int. Cl.[6] H04B** *3/00*

**U.S. Cl. 307—113** **15 Claims**




8. A power feed path switching circuit via which first, second and third stations are coupled to each other in a normal state, said power feed path switching circuit comprising:

a first path connecting the first and second stations via a branching node;

a second path connecting the third station and the branching node;

first means for sensing a predetermined current flowing in said first path and for disconnecting said second path from the branching node when the first current is sensed;

second means, coupled to said first means, for gradually discharging the second path when a first predetermined period has elapsed after the predetermined current is sensed; and

third means, coupled to said first means, for grounding the second path when a second predetermined period longer than the first predetermined period has elapsed after the predetermined current is sensed.

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**5,491,369**

**MAGNETOSTRICTIVE TORQUE SENSOR SHAFT**

**Renshiro Ishino, Kobe; Taro Saito, Osaka, and Matsumi Sunahata, Sakia, all of, Japan, assignors to Kubota Corporation, Osaka, Japan**

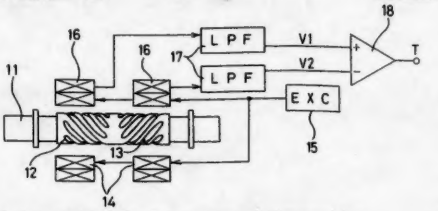
**PCT No. PCT/JP93/01175, § 371 Date Apr. 19, 1994, § 102(e) Date Apr. 19, 1994, PCT Pub. No. WO94/04896, PCT Pub. Date Mar. 3, 1994**

**PCT Filed Aug. 23, 1993, Ser. No. 211,885**

**Claims priority, application Japan, Aug. 24, 1992, 4-223110**

**Int. Cl.[6] H01L** *41/12*

**U.S. Cl. 310—26** **6 Claims**




1. A magnetostrictive torque sensor shaft comprising

knurl grooves formed on the surface of shaft base material in oblique relation to the axis thereof,

the shaft base material strengthened by being heat treated after the formation of the knurl grooves,

a surface treated layer formed on the heat treated shaft base material for improvement of the strength of bond between the shaft base material and a magnetostrictive layer and/or for improvement of the sensor characteristics of a torque sensor comprising the torque sensor shaft,

the magnetostrictive layer formed at least on the surface of the knurl grooves included in the outer periphery of the shaft base material, having predetermined thickness and including a plated layer, a sprayed layer, or the like formed by a chemical process and/or physical process,

wherein the magnetostrictive layer comprises an FeNi alloy plated layer, the Fe component content of the alloy plated layer being more than 0% but less than 25%.

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**5,491,370**

**INTEGRATED AC MACHINE**

**Eric D. Schneider, Carmel; Steven R. McMullen, Anderson; Kaushik Rajashekara, Carmel; Wayne J. Loynes, Indianapolis; William E. Boys, Anderson, and Ronald A. Martin, Pendleton, all of Ind., assignors to General Motors Corporation, Detroit, Mich.**

**Filed Jan. 28, 1994, Ser. No. 187,985**

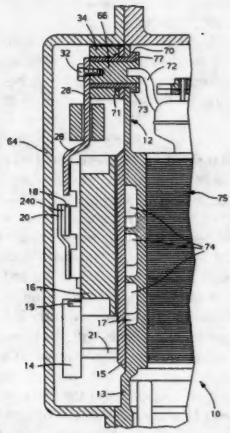
**Int. Cl.[6] H02K** *9/19;5/20;11/00*

**U.S. Cl. 310—54** **6 Claims**

1. An electric motive power unit including a multiple phase AC electric machine and heat dissipative electronic components therefor;

the improvement wherein the machine is disposed in a thermally conductive housing having cooling fluid passages formed therein;

the heat dissipative electronic components are individually mounted on an exterior periphery of said housing and distributed in a fashion wherein circulation of the fluid through said fluid passages for the cooling of said machine also serves to cool said heat dissipative electronic components, wherein the heat dissipative electronic components are constructed as modules, wherein each of said modules



includes a gate driver circuit, an insulated gate bi-polar transistor unit; and means for coupling said insulated gate bi-polar transistor unit to said AC machine; and including a plurality of bus bars extending circumferentially around said modules to interconnect respective positive and negative high voltage terminals.

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**5,491,371**

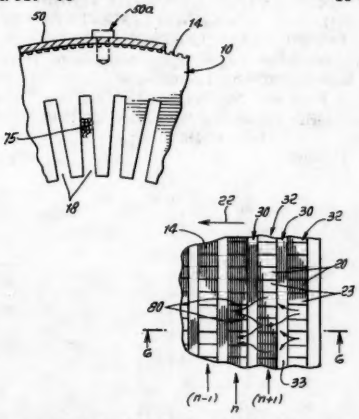
**ELECTRICAL MACHINERY LAMINATIONS COOLING**

**Kean K. Ooi, Yorba Linda, Calif., assignor to Able Corporation, Yorba Linda, Calif.**

**Filed Dec. 13, 1993, Ser. No. 165,321**

**Int. Cl.[6] H02K** *9/18;9/19;9/22;1/12*

**U.S. Cl. 310—58** **16 Claims**



1. In a coaxial stack of laminations for the stator or rotor of an electrical machine, the improvement combination comprising:

a) first groups of first laminations each first lamination having a first periphery extending about a central axis defined by the lamination,

b) each first lamination also having a series of circularly spaced peripheral protrusions projecting away from said periphery and from the main extent of the lamination,

c) there being spaced groups of said protrusions in said stack and wherein the protrusions of each group extend in side-by-side stacked relation,

d) there being second groups of second laminations in said stack and located between laminations in said first groups of first laminations, said second laminations being free of peripheral protrusions, whereby circularly open annular passages are formed outwardly of said second groups of second laminations and between said spaced groups of protrusions,

e) the groups of stacked protrusions in each first group of first laminations being staggered about said axis relative to the groups of stacked protrusions in the next in axial sequence first group of first laminations,

f) there being annular gaps between said protrusion first groups, which are substantially less than twice the annular dimensions of said protrusion first groups.

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**5,491,372**

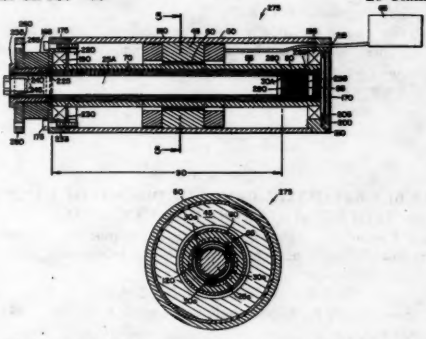
**ELECTRIC LINEAR ACTUATOR WITH PLANETARY ACTION**

**Timothy A. Erhart, Chanhassen, Minn., assignor to Exlar Corporation, Chanhassen, Minn.**

**Continuation of Ser. No. 999,463, Dec. 29, 1992, abandoned, which is a continuation of Ser. No. 775,113, Oct. 11, 1991, abandoned. This application Sep. 22, 1993, Ser. No. 125,495**

**Int. Cl.[6] H02K** *7/06;7/10*

**U.S. Cl. 310—80** **20 Claims**



19. An electrically powered linear actuator, comprising:

(a) a generally cylindrically shaped housing assembly;

(b) an energizable stator supported by the housing assembly;

(c) an armature drive cylinder comprised of an elongated cylinder with magnetic material mounted about an outer circumference, the elongated cylinder including an internally threaded bore, wherein the armature drive cylinder is rotatably mounted within the housing assembly;

(d) an output shaft coaxially aligned with the armature drive cylinder and including a thread engaging portion about the periphery of the output shaft, wherein the extent of the thread engaging portion is smaller than the extent of the internally threaded bore of the elongated cylinder, whereby the difference therebetween defines a maximum actuation stroke for the output shaft; and

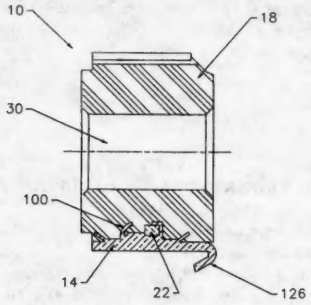
(e) a plurality of transmission rollers rotatably mounted to the output shaft in an axial alignment with the longitudinal axis of the output shaft, wherein the transmission rollers include camming surfaces in operative engagement with the threaded bore of the cylinder and the thread engaging portion of the output shaft, and wherein when the cylinder rotates and the output shaft is not allowed to rotate, then the transmission rollers move along the threaded bore of the cylinder and directly transfer the movement and force to the output shaft providing bidirectional linear movement to the output shaft.

5,491,373

## COMMUTATORS

David L. Cooper, Buies Creek; Robert C. Dunigan, Benson; Joseph M. Grenier, and Eric G. Lee, Dunn, all of N.C., assignors to The Morgan Crucible Company plc, Windsor, England

Filed Sep. 7, 1994, Ser. No. 302,117
Int. Cl.[6] H01R *39/16;39/52*
U.S. Cl. 310—235 10 Claims



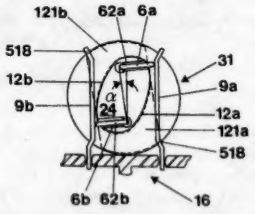

1. A rotary switch comprising:
a. an electrically non-conductive core;
b. electrically non-conductive means, embedded in the core, for reinforcing the switch; and
c. a plurality of electrically conductive segments spaced about the core, each segment having an anchoring system embedded in the core and formed about the reinforcing means to fasten the segment thereto.

5,491,374

## DOUBLE-BASED LOW-PRESSURE DISCHARGE LAMP WITH MISALIGNMENT-TOLERANT BASES

Horst Porembski, Munich, Germany, assignor to Patent-Treuhand-Gesellschaft F. Elektrische Gluehlampen mbH, Munich, Germany

Filed Apr. 18, 1994, Ser. No. 229,177
Claims priority, application Germany, Apr. 20, 1993, 9305977 U
Int. Cl.[6] H01J *5/48;1/62;17/18*
U.S. Cl. 313—318.02 8 Claims



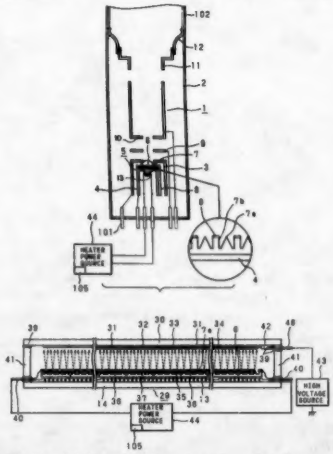

1. Double based low-pressure discharge lamp (1) having
a tubular discharge vessel (2);
electrodes (20) located at respective ends of the discharge vessel;
a glass melt seal (24, 23) at each end of the discharge vessel, each seal defining a press plane;
electrode current supply leads, electrically connected to the respective electrodes and passing through each of the glass melt seals,
said electrode current supply leads having portions (6a, 6b) extending outside of the glass melt seals,
the current supply leads at each end of the discharge vessel being located in a plane which is essentially parallel to the axis of the discharge vessel;
two bases (3, 31, 32,), one each being secured to the discharge vessel at the respective end thereof,
each base having an essentially sleeve-like cylindrical portion (3a) surrounding the discharge vessel (2) and an essentially plate-like end portion (4) which defines two narrow wall portions (18a, 18b), two side wall portions (5a, 5b) and an end face (7),
said end portion being formed with openings (8a, 8b) extending axially through the end face (7) and being located essentially in said press plane, said externally extending current supply lead portions (6a, 6b) extending through said openings, being bent over said end face (7) in respectively opposite directions and then further bent axially with respect to the tubular vessel, and towards the tubular vessel, lying on and fitting against opposite side wall portions (5a, 5b) of the end portion (4) of the base (3) to define bent-back lead portions,
said lamp comprising, in accordance with the invention,
an arrangement for ensuring contact of the bent-back lead portions (6a, 6b) of the current supply leads with socket terminals (9a, 9b) located in pre-aligned positions, while permitting limited respective misalignment of the end portions (4) of the respective bases (3) at the ends of the discharge vessel, and hence of said bent-back lead portions (6a, 6b) extending therefrom,
wherein, in said arrangement, the end portion (4, 24, 34) of the base (3) has the shape of a deformed rectangle, or deformed parallelogram, in which at least two of the junctions or corners (1118) between the narrow wall (18a, 18b) and the wide side wall portions (11a, 11b) are set back from a theoretical geometric rectangle or parallelogram, to form, respectively, relieved wide side wall portions (11a, 11b; 12a, 12b; 13a, 13b), which relieved portions extend axially essentially over the entire length of the end portion (4, 24, 34) of the base.

5,491,375

## CATHODE, ELECTRON GUN, AND CATHODE-RAY TUBE HAVING A HEATING ELEMENT FOR USE DURING COLD ELECTRON EMISSON

Yasuo Iwasaki, Nagaokakyo, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed May 20, 1994, Ser. No. 246,710
Claims priority, application Japan, Dec. 22, 1993, 5-324144
Int. Cl.[6] H01J *29/50*
U.S. Cl. 313—409 15 Claims




1. A cathode which emits electrons toward a fluorescent layer functioning as an anode, comprising:

an electron emission portion having a projection, a tip of said projection being sharpened;

an electron pulling electrode which is disposed in the vicinity of said tip and which pulls out electrons from said tip; and

a heat source which heats said electron emission portion during electron emission, thereby preventing said tip from adsorbing gas molecules.

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5,491,376

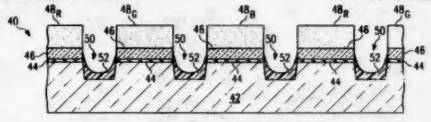
## FLAT PANEL DISPLAY ANODE PLATE HAVING ISOLATION GROOVES

Jules D. Levine, Dallas; Chi-Cheong Shen, Richardson, and Bruce E. Gnade, Dallas, all of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Jun. 3, 1994, Ser. No. 253,476

Int. Cl.[6] H01J *17/24;1/62;29/10*

U.S. Cl. 313—495 33 Claims



1. An anode plate for use in a field emission device, said anode plate comprising:

a substantially transparent substrate;

spaced-apart, electrically conductive regions on a surface of said substrate; and

luminescent material overlying said conductors;

said substrate having grooves formed in said surface in the spaces between said conductive regions.

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5,491,377

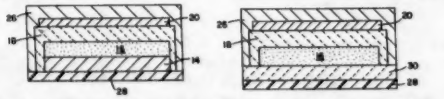
## ELECTROLUMINESCENT LAMP AND METHOD

Albert Janusauskas, 110 Brickyard Rd., Farmington, Conn. 06032

Filed Aug. 3, 1993, Ser. No. 101,413

Int. Cl.[6] H01J *1/70*

U.S. Cl. 313—506 16 Claims



7. In a thick film, screen printed EL lamp with a front conductor layer, a white dielectric layer, a phosphor layer, a rear conductor and a protective overcoat layer, the improvement comprising the use of a common binder for all of the layers except the rear conductor layer to thereby reduce the susceptibility of the lamp to moisture wherein the white dielectric layer comprises by weight:

(a) titanium dioxide (20–60%);

(b) silicon dioxide (3–10%);

(c) aluminum silicate (3–10%);

(d) 2-(2-ethoxyethoxy)-ethyl acetate (5–25%);

(e) 2-butoxyethyl acetate (5–25%); and

(f) polyvinylidene fluoride (2–30%).

5,491,378

## ELECTRO LUMINESCENCE DEVICE AND METHOD FOR FABRICATING THE SAME

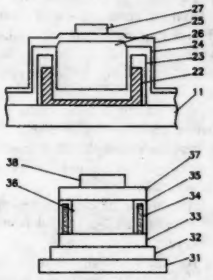
Eun Y. Lee, Seoul, and Hyoung K. Bae, Kyungki-Do, both of, Rep. of Korea, assignors to Goldstar Co., Ltd., Rep. of Korea

Filed Aug. 4, 1994, Ser. No. 285,928

Claims priority, application Rep. of Korea, Sep. 7, 1993, 17923/1993; Jan. 30, 1993, 22914/1993

Int. Cl.[6] H01L *31/12*

U.S. Cl. 313—506 7 Claims



1. An electro luminescence device comprising:

a substrate;

a lower electrode formed on an upper surface of the substrate;

a light shield element formed on a predetermined portion of the lower electrode;

an insulation film formed above the light shield element and the lower electrode;

a luminescence layer formed on an upper surface of the insulation film;

a further insulation film formed on an upper surface of the luminescence layer;

an upper electrode formed on an upper surface of the further insulation layer;

said light shield element being fabricated of a material and being disposed to reflect light toward side surfaces of said luminescence layer; and

wherein the lower electrode has a recess at a central portion thereof and a protrusion formed along a peripheral edge, the light shield element including the protrusion.

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5,491,379

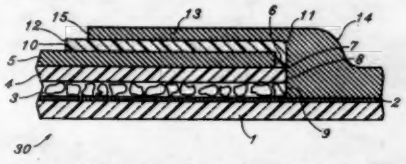
## ELECTROLUMINESCENT EDGE CONNECT-COMPOSITE LAMP/STRIP AND METHOD OF MAKING THE SAME

Lyman R. Daigle, Bethlehem; Andrew C. Ledesma, Woodbury, both of Conn., and Sotero A. Ang, Mandaue City, Philippines, assignors to Timex Corporation, Middlebury, Conn.

Filed Oct. 11, 1994, Ser. No. 320,813

Int. Cl.[6] H01D *63/04;* B05D *5/12*

U.S. Cl. 313—509 11 Claims



1. A process for providing a pair of electrical contact areas on one side of an electroluminescent lamp, comprising the steps of:

providing a transparent substrate having a first conductive layer thereon, the first conductive layer having an edge;

depositing an electroluminescent layer on the first conductive layer, the electroluminescent layer having an edge spaced from the edge of the first conductive layer;

depositing a first insulating layer on the electroluminescent layer, the first insulating layer having an edge spaced from the edge of the first conductive layer;

depositing a second conductive layer on the first insulating layer, the second conductive layer having an edge spaced from the edge of the first conductive layer;

depositing a second insulating layer on the second conductive layer, the second insulating layer having an insulating end extending around and enclosing the edge of the second conductive layer; and

depositing a film of conductive material on the second insulating layer, the film having a conductive end extending around the insulating end and making electrical contact with the first conductive layer.

**10**. An electroluminescent lamp for a timepiece, which comprises:

a transparent substrate having a first conductive layer thereon, the first conductive layer having an edge;

an electroluminescent layer on the first conductive layer, the electroluminescent layer having an edge spaced from the edge of the first conductive layer;

a first insulating layer on the electroluminescent layer, the first insulating layer having an edge spaced from the edge of the first conductive layer;

a second conductive layer on the first insulating layer, the second conductive layer having an edge spaced from the edge of the first conductive layer;

a second insulating layer on the second conductive layer, the second insulating layer having an insulating end extending around and enclosing the edge of the second conductive layer; and

a film of conductive material on the second insulating layer, the film having a conductive end extending around the insulating end and making electrical contact with the first conductive layer.

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**5,491,380**

## PHOTOMULTIPLIER INCLUDING AN ELECTRON MULTIPLIER FOR CASCADE-MULTIPLYING AN INCIDENT ELECTRON FLOW USING A MULTILAYERED DYNODE

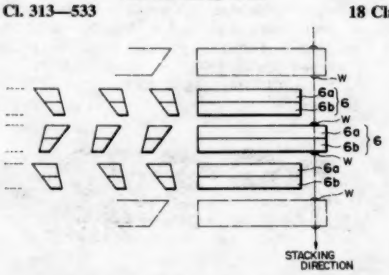
**Hiroyuki Kyushima; Koji Nagura; Yutaka Hasegawa; Eiichiro Kawano; Tomihiko Kuroyanagi; Akira Atsumi, and Masuya Mizuide, all of Hamamatsu, Japan, assignors to Hamamatsu Photonics, K.K., Hamamatsu, Japan**

**Filed Apr. 28, 1994, Ser. No. 234,152**

**Claims priority, application Japan, Apr. 28, 1993, 5-102898; Apr. 28, 1993, 5-102902; Apr. 28, 1993, 5-102910; Apr. 30, 1993, 5-104667**

**Int. Cl.[6] H01J** *43/22*

**U.S. Cl. 313—533** **18 Claims**




**1**. An electron multiplier comprising:

an anode plate for supporting at least one anode; and

a dynode unit having a plurality of stages including a plurality of dynode plates stacked in an incident direction of electrons, said dynode plates spaced apart from each other by insulating members at predetermined intervals such that a last-stage dynode plate of said dynode unit opposes in parallel to a front surface of said anode plate, each said dynode plate supporting at least one dynode for cascade-multiplying the incident electrons and being integrally formed by welding at least two plates overlapping each other in a stacking direction of said dynode plates,

wherein a welding position of said at least two plates that overlap each other to form one of said dynode plates of said dynode unit does not overlap in the stacking direction of said dynode plates a welding position of an adjacent dynode plate formed from another of said at least two plates.

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**5,491,381**

## DISCHARGE TUBE

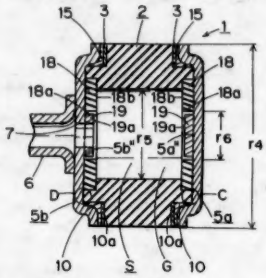
**Gijun Idei; Takuji Kinoshita, and Kunio Hoshino, all of Shizuoka, Japan, assignors to Yazaki Corporation, Tokyo, Japan**

**Continuation of Ser. No. 992,094, Dec. 17, 1992, abandoned. This application Jan. 18, 1995, Ser. No. 375,513**

**Claims priority, application Japan, Dec. 18, 1991, 3-335257**

**Int. Cl.[6] H01T** *2/02*

**U.S. Cl. 313—589** **12 Claims**




**1**. A discharge tube, comprising:

a cylindrical envelope made of an insulating substance;

discharge gas enclosed in a cavity of said envelope;

a pair of discharge electrodes disposed in an opposing relationship to each other at the opposite ends of said envelope, said discharge electrodes being formed as parallel plate electrodes wherein faces thereof facing the inside of said envelope extend flat and in parallel to each other; and

a pair of conductive layers formed on said envelope in an opposing relationship to and electrically connected to said discharge electrodes, one of said conductive layers being opposed with at least part of the other conductive layer and with a portion of said envelope interposed therebetween,

said conductive layers forming an electric field in the envelope approximating a uniform electric field formed in the cavity of said envelope.

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**5,491,382**

## COLOR PICTURE TUBE APPARATUS

**Jiro Shimokobe; Eiji Kamohara, and Takashi Nishimura, all of Fukaya, Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan**

**Filed Sep. 9, 1994, Ser. No. 303,814**

**Claims priority, application Japan, Sep. 9, 1993, 5-224076**

**Int. Cl.[6] H01J** *29/70*

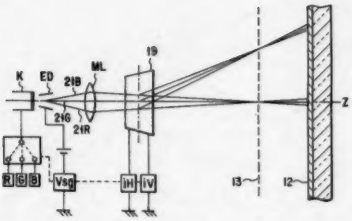
**U.S. Cl. 315—17** **7 Claims**

**1**. A color picture tube apparatus comprising:

means for generating first, second, and third video signals;

means for generating a single electron beam;

applying means for continuously and alternately supplying said first, second, and third video signals to said single electron beam generating means to modulate said single electron beam;




control means for forming a crossover by controlling said single electron beam;

auxiliary deflecting means for accelerating said single electron beam from said crossover, said auxiliary deflecting means splitting said accelerated single electron beam into first, second, and third electron beam segments respectively corresponding to said first, second, and third video signals, said auxiliary deflecting means splitting said accelerated single electron beams by performing electrostatic auxiliary deflection of said accelerated single electrode beam in synchronism with application of said first, second and third video signals to said single electron beam generating means;

light ray generating means for generating light rays in response to incidence of said first, second, and third electron beam segments;

an electron lens for focusing said first, second, and third electron beam segments from said first auxiliary deflecting means on said light ray generating means; and

main deflecting means for deflecting said first, second, and third electron beam segments to scan said light ray generating means with said electron beam segments in horizontal and vertical directions,

wherein said auxiliary deflection means are located sufficiently close to said crossover to permit said auxiliary deflecting means to focus said first, second and third electron beam segments directly upon said electron lens.

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**5,491,383**

**MOTOR VEHICLE LIGHT CONTROLLING DEVICE**

**Heinz Leiber, Oberriexingen; Heinz-Georg Burghoff, Reichenbach, and Horst Brinkmeyer, Waiblingen, all of, Germany, assignors to Mercedes-Benz AG, Germany**

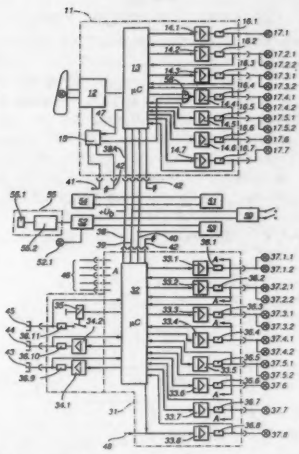
**Filed Dec. 2, 1994, Ser. No. 352,210**

**Claims priority, application Germany, Dec. 2, 1993, 43 41 058.8**

**Int. Cl.[6] B60Q** *1/26*

**U.S. Cl. 315—77** **24 Claims**

1. A light controlling device for a motor vehicle, comprising an operating switch and electronic apparatus assigned to the operating switch for supplying current to a multiplicity of lamps of an operating light system and having for each lamp function at least one controlled switching component for clock-controlled supplying of current to an assigned lamp, wherein the apparatus includes a light switch module and a rear lamp module, clock controlling apparatus being distributed over the rear lamp module, and both modules being connected to each other via a maximum of three line conductors in addition to a frame terminal, the light switch



module being arranged in a dashboard region and the rear lamp module being installed in a rear region adjacent the rear lights, and the lamp currents being clock-controlled such that the luminosity of certain lights can be lowered as required and/or the on-board system voltage can be increased temporarily without the luminosity changing significantly as a result.

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**5,491,384**

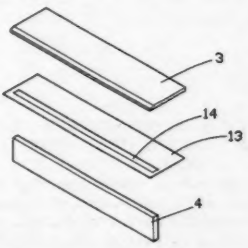
**LIGHT SOURCE FOR A CONTACT IMAGE SENSOR**

**Cheden Cheng, Taipei Hsien; Shih S. Huang, Taipei; Tsung M. Ko, Taipei Hsien, and Hsin C. Su, Taipeihsien, all of, Taiwan, Prov. of China, assignors to Dyna Image Corporation, Taipei, Taiwan, Prov. of China**

**Filed Aug. 30, 1994, Ser. No. 297,781**

**Int. Cl.[6] G09G** *3/10*

**U.S. Cl. 315—169.3** **1 Claim**




1. A contact image sensor, comprising an electroluminescent screen fastened to a back side of a scanning face glass of the contact image sensor and spaced apart from a lens of said contact image sensor, said electroluminescent screen acted upon by electric power to emit light onto a document to be scanned, said electroluminescent screen having a narrow slot through which reflected light from said document passes to said lens.

**5,491,385**

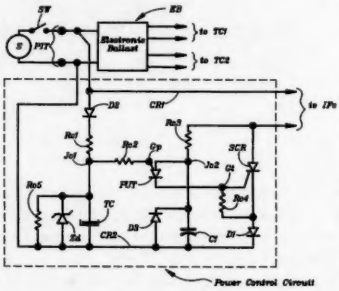
## INSTANT-ON SCREW-IN FLUORESCENT LAMP

**Ole K. Nilssen, Caesar Dr., Barrington, Ill. 60010**

**Continuation-in-part of Ser. No. 955,229, Oct. 1, 1992, Pat. No. 5,233,270, which is a continuation of Ser. No. 607,271, Oct. 31, 1990, abandoned, which is a continuation-in-part of Ser. No. 787,692, Oct. 15, 1985, abandoned, which is a continuation of Ser. No. 644,155, Aug. 27, 1984, abandoned, which is a continuation of Ser. No. 555,426, Nov. 23, 1983, abandoned, which is a continuation of Ser. No. 178,107, Aug. 14, 1980, abandoned. This application Apr. 16, 1993, Ser. No. 47,944**

**Int. Cl.[6] H05B** *41/29;41/38;39/02;39/04*

**U.S. Cl. 315—178** **43 Claims**




1. An arrangement comprising:

a source functional, starting at a first point in time, to provide an AC power line voltage at a pair of AC terminals;

a fluorescent lamp having a first set of lamp terminals;

an electronic ballasting circuit connected between the AC terminals and the first set of lamp terminals; the electronic ballasting circuit being functional, starting at the first point in time and continuing until the AC power line voltage is removed from the AC terminals, to supply to the lamp terminals an alternating current of frequency substantially higher than that of the AC power line voltage, thereby to cause the fluorescent lamp to provide a first luminous output; the first luminous output being characterized by initially being of a relatively low magnitude and subsequently being of a substantially higher magnitude;

an incandescent lamp having a second set of lamp terminals; and

a power control circuit connected between the AC terminals and the second set of lamp terminals; the power control circuit being functional, starting at the first point in time, to cause the incandescent lamp to provide a second luminous output; the second luminous output being characterized by initially being of a relatively high magnitude and subsequently being of a substantially lower magnitude.

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**5,491,386**

## STABLE HIGH FREQUENCY HIGH-PRESSURE DISCHARGE LAMP LIGHTING DEVICE AVOIDING ACOUSTIC RESONANCE

**Hiroyasu Eriguchi; Hiroshi Nishimura; Minoru Yamamoto; Yutaka Iwahori, and Takeshi Kamoi, all of Kadoma, Japan, assignors to Matsushita Electric Works, Ltd., Osaka, Japan**

**Filed Jul. 19, 1994, Ser. No. 277,023**

**Claims priority, application Japan, Feb. 15, 1994, 6-018733**

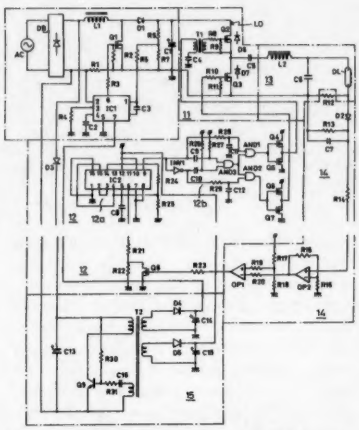
**Int. Cl.[6] H05B** *37/02*

**U.S. Cl. 315—209 R** **10 Claims**

9. A high-pressure discharge lamp lighting device comprising:

a DC power source for generating a DC voltage signal;

an inverter circuit connected to said DC power source for converting the DC voltage signal into an AC voltage signal and including at least a pair of switching elements;



a series resonance circuit, connected to said inverter circuit, having a resonance frequency $f_R$, and including an inductance element and a capacitor;

a high-pressure discharge lamp connected in parallel with said capacitor;

detecting means for detecting whether said high-pressure discharge lamp is in a lighted state or a non-lighted state;

control means for generating a control signal to operate said inverter at a first frequency $f_0$ close to and higher than the resonance frequency $f_R$ during starting of said high-pressure discharge lamp from the non-lighted state to the lighted state, and for operating said inverter at a second frequency $f_1$ when said high-pressure discharge lamp is in the lighted state, the second frequency $f_1$ being outside a frequency range in which acoustic resonance occurs and lower than the resonance frequency $f_R$.

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**5,491,387**

## DISCHARGE LAMP LIGHTING CIRCUIT FOR INCREASING ELECTRIC POWER FED IN INITIAL LIGHTING OF THE LAMP

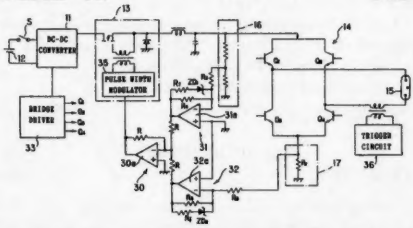
**Shigeru Saito, Omiya, Japan, assignor to Kansei Corporation, Saitama, Japan**

**Filed Jun. 25, 1993, Ser. No. 81,213**

**Claims priority, application Japan, Jun. 29, 1992, 4-170886; Sep. 25, 1992, 4-279218; Sep. 25, 1992, 4-279220**

**Int. Cl.[6] H05B** *41/36*

**U.S. Cl. 315—307** **6 Claims**




1. In a discharge lamp lighting apparatus comprising voltage raising means for raising a DC input voltage, pulse generating means for varying an output voltage output by said voltage raising means to a pulse voltage having a given pulse width and outputting said pulse voltage, and a bridge circuit for applying said pulse voltage to a discharge lamp, said discharge lamp lighting apparatus further comprising:

voltage detecting means for detecting a voltage applied to said discharge lamp;

current detecting means for detecting a current running through said discharge lamp;

first amplifying means for amplifying a voltage detection signal detected by said voltage detecting means;

second amplifying means for amplifying a current detection signal detected by said current detecting means;

first delaying means, connected in parallel to said first amplifying means, for delaying an output of said first amplifying means in order to increase electric power fed to said discharge lamp in initial lighting of said discharge lamp, said first delaying means comprising a resistance and a Zener diode;

second delaying means, connected in parallel to said second amplifying means, for delaying an output for said second amplifying means in order to increase electric power fed to said discharge lamp in initial lighting of said discharge lamp, said second delaying means comprising a resistance and a Zener diode;

adding means for adding a first amplification signal output by said first amplifying means and a second amplification signal output by said second amplifying means; and

pulse width modulating means for controlling the pulse width of said pulse voltage so that an addition signal output by said adding means becomes a predetermined value.

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**5,491,388**

## POWER REGULATOR OF DISCHARGE LAMP AND VARIABLE COLOR ILLUMINATION APPARATUS USING THE REGULATOR

**Yamada Nobuyuki; Douke Takahiro, and Tsuji Hidetoshi, all of Kitakyushu, Japan, assignors to Toto Ltd., Japan**

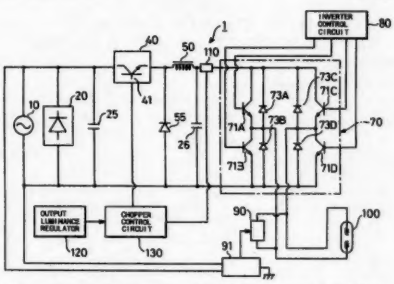
**PCT No. PCT/JP93/00353, § 371 Date Sep. 22, 1994, § 102(e) Date Sep. 22, 1994, PCT Pub. No. WO93/19570, PCT Pub. Date Sep. 30, 1993**

**PCT Filed Mar. 24, 1993, Ser. No. 307,677**

**Claims priority, application Japan, Mar. 25, 1992, 4-98949; Apr. 23, 1992, 4-131854; Feb. 24, 1993, 5-61005**

**Int. Cl.[6] G05F** *1/00*

**U.S. Cl. 315—308** **17 Claims**




1. A power regulator for controlling a power supplied to a discharge lamp, comprising:

a converter for converting a first alternating-current power to a direct-current power;

an inverter for converting said direct-current power to a second alternating-current power and supplying said second alternating-current power to said discharge lamp;

an inverter control circuit for controlling said inverter;

power setting means for arbitrarily setting a desired value corresponding to a current of said discharge lamp and outputting a setting signal indicative of said desired value; and

dimmer control means for controlling the power supplied to said discharge lamp based on said desired value set by said power setting means, comprising:

current regulation means having a current control terminal, interposed between said converter and said inverter, for regulating an output current according to a current control signal supplied to said current control terminal, current detection means for detecting the output current of said current regulation means to thereby generate a detection signal, and

current control means for outputting the current control signal to said current control terminal of said current regulation means so that the detection signal output from said current detection means coincides with the setting signal supplied from said power setting means,

wherein said inverter control circuit converts said direct-current power to said second alternating-current power of a constant frequency; and

an output voltage and an output current of said power regulator have a linear relationship, and a gradient of said linear relationship is varied according to said desired value specified by said power setting means.

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**5,491,389**

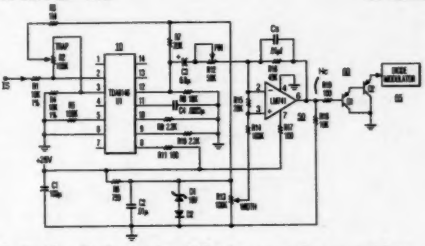
## RASTER EDGE CORRECTION WAVEFORM

**Ronald E. Fernsler, and Kevin M. Williams, both of Indianapolis, Ind., assignors to Thomson Consumer Electronics, Inc., Indianapolis, Ind.**

**Filed May 11, 1994, Ser. No. 241,021**

**Int. Cl.[6] H01J** *29/56*

**U.S. Cl. 315—371** **13 Claims**



1. A video display having deflection correction comprising:

a cathode ray tube;

a deflection coil mounted on said cathode ray tube;

a deflection amplifier coupled to said deflection coil to generate a deflection current therein that produces a raster having horizontal line length variations which describe a generally sinusoidally shaped raster edge;

a diode modulator coupled to said deflection coil for generating a corrective current therein responsive to a composite corrective signal; and,

a corrective signal generator generating a parabolic shaped signal coupled to an amplifier having frequency selective feedback for generating said composite corrective signal having a generally parabolic shape which includes a sinusoidal shape, said composite corrective signal being coupled to said modulator for raster correction.

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**5,491,390**

## ELECTRIC PROPULSION SYSTEM FOR A BICYCLE

**James R. McGreen, 1617 Willow St., Alameda, Calif. 94501**

**Filed Jan. 18, 1994, Ser. No. 181,780**

**Int. Cl.[6] B62D** *3/00*

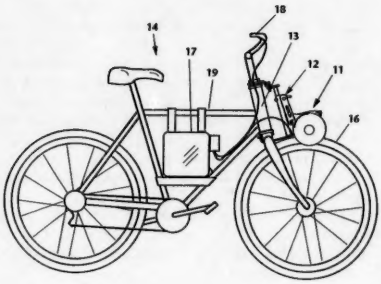
**U.S. Cl. 318—5** **53 Claims**

1. An electric propulsion system for a bicycle, including:

a pair of electric motors having output shafts joined to a common drive roller;

motor mounting means for pivotally securing said pair of electric motors to a frame portion of the bicycle;

wherein a torque of said motors creates a reaction force to cause impingement of said drive roller on the tire, and wherein when the drive roller impinges on the tire, the torque of said motors further urges said drive roller into greater frictional engagement with the tire.

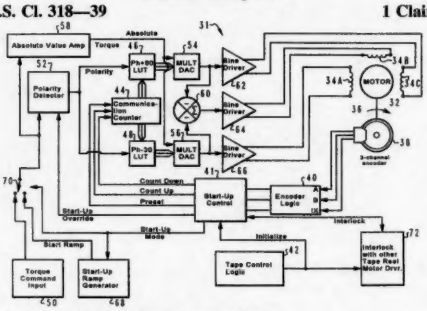



## 5,491,391

## START UP CIRCUIT FOR CONTINUOUS SINE-WAVE COMMUTATED BRUSHLESS MOTORS

**Allen A. Bahr; Du V. Nguyen, and Gary A. Teichman, all of Tucson, Ariz., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed Sep. 16, 1993, Ser. No. 122,113**
**Int. Cl.[6] B23Q** *5/10*
**U.S. Cl. 318—39** **1 Claim**




1. A tape drive mechanism, comprising:

means for setting phase angle counters for a shaft for a takeup motor and for a shaft for a supply motor to predetermined values;

means for locking out the supply motor;

means for incrementing the phase angle counter for the takeup motor;

means for generating a ramp scaler for the takeup motor;

means responsive to the phase angle counter for the takeup motor and ramp scaler for the takeup motor for generating a plurality of phase differentiated armature currents;

means for detecting a direction of rotation of the takeup motor;

means responsive to the takeup motor rotating in an undesired direction for reversing the direction of the armature currents;

means responsive to encountering an index mark defining take up motor rotation position for setting the phase angle counter to a predetermined base phase value and locking out the takeup motor while enabling the supply motor;

means for incrementing the phase angle counter for the supply motor;

means for generating a ramp scaler for the supply motor;

means responsive to the phase angle counter for the supply motor and ramp scaler for the supply motor for generating a plurality of phase differentiated armature currents for the supply motor;

means for detecting a direction of rotation of the supply motor;

means responsive to the supply motor rotating in an undesired direction for reversing direction of the armature currents; and

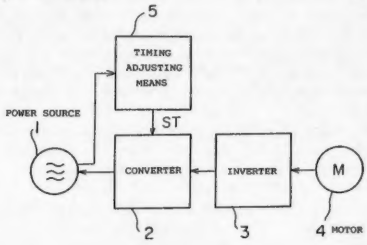
means responsive to encountering an index mark for the supply motor for setting the phase angle counter for the supply motor to a predetermined base phase value and enabling the takeup motor.

## 5,491,392

## POWER SOURCE REGENERATIVE APPARATUS

**Takashi Harada, and Eiichi Sasuga, both of Minamitsuru, Japan, assignors to Fanuc Ltd., Yamanashi, Japan**

**PCT No. PCT/JP93/01084, § 371 Date Mar. 25, 1994, § 102(e) Date Mar. 25, 1994, PCT Pub. No. WO94/03966, PCT Pub. Date Feb. 17, 1994**
**PCT Filed Jul. 30, 1993, Ser. No. 211,273**
**Claims priority, application Japan, Aug. 6, 1992, 4-210375**
**Int. Cl.[6] H02P** *3/14*
**U.S. Cl. 318—376** **2 Claims**




1. A power source regenerative apparatus for regenerating induction electromotive force caused in decelerating a motor to a power source, comprising:

an inverter for transforming an induction electromotive force, caused in decelerating the motor, into a direct current, to regenerate the power source;

timing adjusting means for outputting a regenerative signal at a predetermined timing before the potential of one phase indicative of the maximum potential in three-phase supply voltages becomes the same potential as that of another phase; and

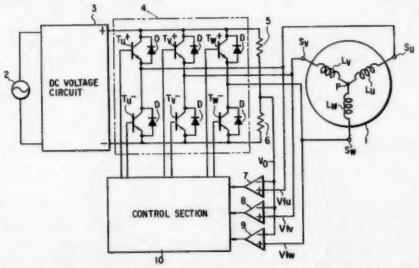
a converter for converting the direct current into an alternating current based on said regenerative signal, and for regenerating said alternating current to said power source.

## 5,491,393

## DRIVE CONTROL APPARATUS FOR BRUSHLESS DC MOTOR AND DRIVING METHOD THEREFOR

**Michika Uesugi, Fuji, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan**

**Filed Mar. 18, 1994, Ser. No. 214,845**
**Claims priority, application Japan, Aug. 25, 1993, 5-210708**
**Int. Cl.[6] H01R** *39/46*
**U.S. Cl. 318—439** **4 Claims**




1. An apparatus for a brushless DC motor which includes a stator having three phase windings and a rotor having magnets, comprising:

a switching circuit including three series circuits, each of said three series circuits including a pair of switching elements connected in series such that a connector node is defined between said pair of switching elements, each of said connection nodes being connected to a corresponding one of said phase windings, wherein each pair of switching elements includes a first switching element connected on an upstream

side of said phase windings and a second switching element connected on a downstream side of said phase windings with respect to current flow through said phase windings;

a DC voltage circuit for outputting a DC voltage to said three series circuits; and

a control section for:

i) sequentially selecting and energizing said phase windings by setting one of said first switching elements in a first series circuit and one of said second switching elements in a second series circuit in an ON state, while intermittently turning ON said second switching element in said first series circuit and said first switching element in said second series circuit, and sequentially selecting, while said DC motor is operating, other switching elements in said three series circuits to be placed in an ON state and correspondingly switching elements to be intermittently turned on,

ii) upon turning on said first switching element in said first series circuit and said second switching element in said second series circuit, maintaining said first switching element in said first series circuit and said second switching element in said second series circuit in said ON state for a first preset initial period of time, while intermittently turning ON said second switching element in said first series circuit and said first switching element in said second series circuit, which has not yet been set in said ON state, for said first preset initial period of time,

iii) controlling an ON/OFF duty of said switching elements to be intermittently turned ON to adjust a speed of said brushless DC motor,

iv) detecting a rotational position of said rotor according to a variation in an induced voltage occurring in one of said phase windings which is set in a non-energized state,

v) controlling a timing of switching of an energization of said phase windings according to said detected rotation position,

vi) comparing a level of an induced voltage occurring in one of said phase windings which is set in said non-energized state with a level of a preset reference voltage and detecting said rotational position of said rotor as a reference rotation position when said level of said induced voltage corresponds to said level of said preset reference voltage,

vii) maintaining one of said first switching elements in said ON state and intermittently turning ON one of said second switching elements in a case where said induced voltage occurring in one of said phase windings, which is set in a non-energized state, varies in a falling direction, and

viii) intermittently turning ON one of said first switching elements and maintaining one of said second switching elements in said ON state in a case where said induced voltage occurring in one of said phase windings, which is set in said non-energized state, varies in a rising direction.

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**5,491,394**

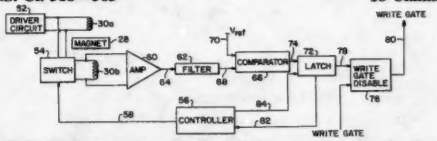
## ACCELERATION SENSING WRITE DISABLE SYSTEM UTILIZING ACTUATOR ARM COIL

**Gordon A. Harwood, Longmont; Harold J. Beecroft, Colorado Springs, and Robert L. Metz, Westminster, all of Colo., assignors to Maxtor Corporation, San Jose, Calif.**

**Filed Aug. 20, 1993, Ser. No. 109,816**

**Int. Cl.[6] G05B** *9/02;* **G11B** *5/54*

**U.S. Cl. 318—563** **18 Claims**




1. A shock sensing system that disables a write gate of a hard disk drive in response to a shock applied to the disk drive, comprising:

a rotating media;

a transducer coupled to said media;

an actuator arm that supports said transducer, said actuator arm being adapted to move relative to said media;

a magnet coupled to said actuator arm;

a first coil coupled to said magnet, said first coil being capable of providing a back emf signal in response to a movement of said actuator arm;

a driver circuit that provides a current to said first coil to move said actuator arm;

a switch circuit having first and second switch positions and being electrically communicable with said first coil, said first coil electrically connected to said switch circuit in said first position wherein said current from said driver circuit flows between said switch circuit and said first coil during a track seeking operation when said actuator arm is moving relative to said media and said first coil being electrically disconnected from said switch circuit in said second position wherein substantially no current flows between said switch circuit and said first coil during a track routine operation in which the transducer is maintained in a track on said media;

a voltage detection circuit which generates a shock detection signal when said back emf signal exceeds a predetermined voltage during said track routine operation; and

a write disable circuit which disables the write gate in response to the generation of said shock detection signal.

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**5,491,395**

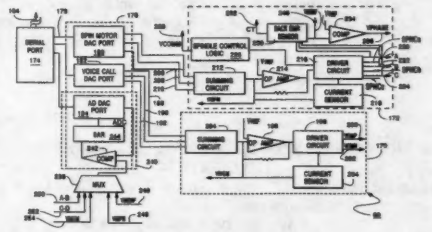
## TUT SERVO IC ARCHITECTURE

**Larry Hutsell; Curt Bruner; Jeff Reh, and Glenn Albert, all of Longmont, Colo., assignors to Maxtor Corporation, Longmont, Colo.**

**Filed Sep. 17, 1993, Ser. No. 123,325**

**Int. Cl.[6] G11B** *21/02*

**U.S. Cl. 318—560** **37 Claims**




1. A servo integrated circuit chip that can be coupled to a controller chip that generates digital spin motor and digital voice coil motor commands to control a spin motor for rotating a disk and a voice coil motor for positioning an actuator arm assembly relative to the disk, said servo integrated circuit chip comprising:

a digital-to-analog converter circuit that converts the digital spin motor and digital voice coil motor commands from the controller chip to analog spin motor and analog voice coil motor control signals; and

a spin motor control circuit that receives said analog spin motor control signal from said digital-to-analog converter circuit and controls the spin motor and thereby the rotational speed of the disk;

a voice coil motor control circuit that receives said analog voice coil motor control signal from said digital-to-analog converter circuit and controls the voice coil motor to control the position of the actuator arm assembly relative to the disk;

wherein said digital-to-analog converter circuit, said spin motor control circuit, and said voice coil motor control circuit are disposed on a common substrate within an integrated circuit package.

**5,491,396**

## MAGNETIC BEARING APPARATUS AND ROTATING MACHINE HAVING SUCH AN APPARATUS

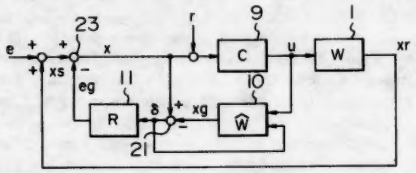
**Naohiko Takahashi, Ibaraki; Minoru Hiroshima, Ushiku; Osami Matsushita, Ibaraki, and Yasuo Fukushima, Tsuchiura, all of, Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed May 17, 1994, Ser. No. 243,904**

**Claims priority, application Japan, May 18, 1993, 5-115595**

**Int. Cl.[6] G05D** *13/00*

**U.S. Cl. 318—632** **9 Claims**




1. A magnetic bearing control apparatus for controlling a magnetic bearing assembly including a magnetic bearing with a rotor and electromagnets for rotatably supporting the rotor by magnetic force, said control apparatus comprising:

a magnetic bearing controller including displacement detecting means for detecting the displacement of the rotor from a predetermined position and providing a displacement signal indicative of the detected displacement; a compensating circuit for determining magnitudes of currents to be applied to the electromagnets of the magnetic bearing so as to hold the rotor at the predetermined position, on the basis of the displacement signal; and current amplifiers for controlling the currents of the electromagnets on the basis of an output signal of said compensating circuit;

a simulating circuit for estimating the position of the rotor from an output signal of said compensating circuit;

a first subtracter for subtracting the output signal of said simulating circuit from the displacement signal; and

a second subtracter for subtracting the output signal of said first subtracter from the displacement signal,

wherein the output signal of said second subtracter is inputted to said compensating circuit and is inputted to the first subtracter as a further displacement signal to be subtracted.

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**5,491,397**

## MOTOR DRIVE DEVICE USING ONE-TWO PHASE EXCITATION

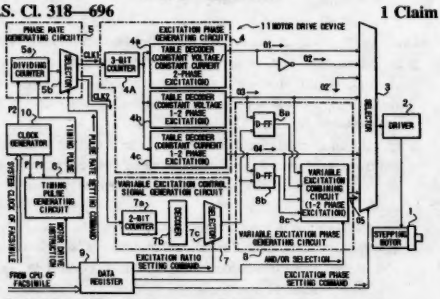
**Hiroyuki Hirakawa, Kyoto, Japan, assignor to Murata Kikai Kabushiki Kaisha, Kyoto, Japan**

**Filed Apr. 22, 1993, Ser. No. 51,630**

**Claims priority, application Japan, Apr. 30, 1992, 4-111521; May 11, 1992, 4-117315**

**Int. Cl.[6] H02P** *8/00*

**U.S. Cl. 318—696** **1 Claim**




1. A motor drive device, comprising:

a first excitation phase generating circuit for generating a first excitation phase for a one-two phase excitation having a first excitation ratio,

a second excitation phase generating circuit for generating a second excitation phase for a one-two phase excitation having a second excitation ratio,

the second excitation ratio differing from the first excitation ratio based upon the excitation phase output from the first excitation phase generating circuit, and

a driver for receiving at least one of the first and second excitation phases.

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**5,491,398**

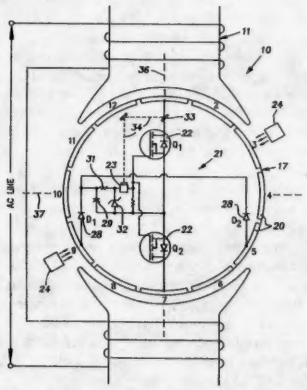
## REPULSION MOTOR

**Lambert Haner, 1975 Wynwood Dr., Rocky River, Ohio 44116**

**Continuation of Ser. No. 37,246, Mar. 26, 1993. This application Sep. 14, 1994, Ser. No. 305,575**

**Int. Cl.[6] H02P** *1/24*

**U.S. Cl. 318—725** **10 Claims**




1. A repulsion dynamoelectric machine comprising a stator and a rotor rotatably mounted about a first axis on said stator said repulsion machine without brushes, an AC field winding on one of said stator and rotor for producing a field, a plurality of coils in an armature winding on the other of said stator and rotor adapted to electromagnetically interact with the field of the field winding, electronic switch means connected to said armature winding to substantially short-circuit successive pairs of its coils when they and the field winding are in relative angular positions where the field is effective to induce a current in the armature winding to produce a resultant relative torque on the rotor.

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**5,491,399**

## LEAD ACID BATTERY REJUVENATOR

**William E. Gregory, 700 Kosstre Ct., Irving, Tex. 75061, and Chester C. Allen, Jr., Dallas, Tex., assignors to William E. Gregory, Irving, Tex.**

**Continuation-in-part of Ser. No. 68,159, May 28, 1993. This application Jul. 16, 1993, Ser. No. 92,515**

**Int. Cl.[6] H02J** *7/00*

**U.S. Cl. 320—61** **9 Claims**

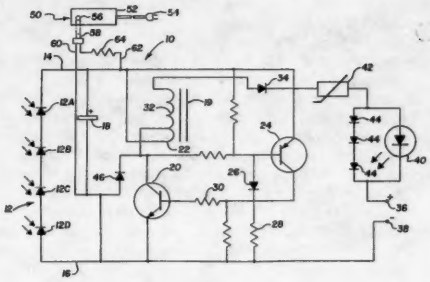
1. A rejuvenator for lead acid batteries comprising:

a first source of d.c. voltage,

a capacitor connected across said source,

a transformer having a primary coil and a secondary coil, said primary coil connected across said capacitor, and

a switching circuit including a first transistor which connects and disconnects said primary coil to and from said capacitor to produce in said secondary coil fast rise time current pulses occurring at a rate of 8.333 KHz for application to a battery.

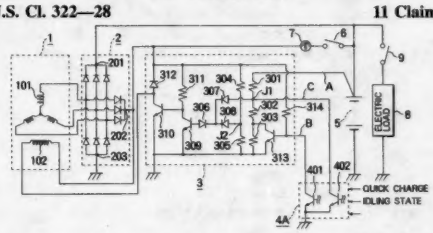


5,491,400

## CONTROL DEVICE FOR A VEHICULAR AC GENERATOR

**Shirou Iwatani, and Tatsuki Kouwa, both of Himeji, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan**

**Filed Jan. 28, 1994, Ser. No. 187,524**
**Claims priority, application Japan, Feb. 4, 1993, 5-017533**
**Int. Cl.[6] H02J** *7/14*
**U.S. Cl. 322—28** **11 Claims**




**1**. A control device for controlling an output voltage of a vehicular AC generator including a coil, an output voltage of said AC generator being adjusted by a current supply to said coil, said control device comprising:

first voltage detector circuit means, electrically coupled to an output of said AC generator, for outputting a first voltage level proportional to an output voltage of said AC generator;

second voltage detector circuit means, electrically coupled to said output of said AC generator, for outputting a second voltage level proportional to said output voltage of said AC generator, said second voltage level being lower than said first voltage level output from said first voltage detector circuit means;

voltage regulation means, coupled to said first and second voltage detector circuit means, for controlling a current supply to said coil of said AC generator thereby adjusting said output voltage of said AC generator to a target level, wherein said voltage regulation means regulates said current supply to said coil of said AC generator in response to a higher one of said first and second voltage levels output from said first and second voltage detector circuit means; and

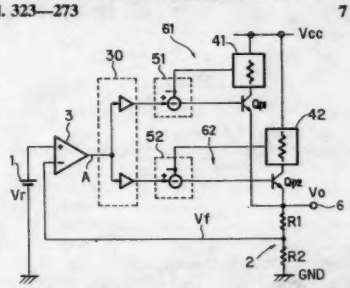
target regulation voltage change-over means for selectively disabling said first voltage detector circuit means to reduce said first voltage level to a level substantially lower than said second level output from said second voltage detector circuit means such that said voltage regulation means controls said output voltage of said AC generator to a target level corresponding to said second voltage level output from said second voltage detector circuit means when said target regulation voltage change-over means disables said first voltage detector circuit means.

5,491,401

## STABILIZED PLURAL OUTPUT TRANSISTOR POWER SOURCE DEVICE HAVING A PLURALITY OF LIMITING CURRENT CONTROL CIRCUITS

**Koichi Inoue, and Takeshi Morishita, both of Kyoto, Japan, assignors to Rohm Co., Ltd., Kyoto, Japan**

**Filed Oct. 25, 1994, Ser. No. 329,073**
**Claims priority, application Japan, Jan. 26, 1993, 5-290137**
**Int. Cl.[6] G05F** *1/40;3/04;* **H02H** *7/00*
**U.S. Cl. 323—273** **7 Claims**




**1**. An IC type stabilized power source circuit which is designed to obtain an output voltage of a predetermined target voltage as an output of an output transistor through voltage drop of a power source voltage by said output transistor, generates an error signal depending on either the difference between said predetermined target voltage and the actual output voltage or a voltage obtained by multiplying a predetermined rate to the predetermined target voltage and a voltage obtained by multiplying the predetermined rate to the actual output voltage, and controls the output current of said output transistor depending on the error signal so as to stabilize the actual output voltage at said predetermined target voltage, comprising:

n pieces of said output transistors, wherein n is a positive integer equal to 2 or more than 2, each outputting to a common output terminal;

n pieces of over current detection circuits provided for the n pieces of said respective output transistors and outputting respective detection signals when the output currents flowing through said respective corresponding output transistors exceed predetermined rated current values set for said respective corresponding output transistors; and

n pieces of control circuits provided for the n pieces of said over current detection circuits and when being received the respective corresponding detection signals each limiting the output currents of said respective corresponding output transistors relating to said over current detection circuits from which the detection signals are received to respective values equal to or less than the respective predetermined rated current values, and wherein the grand total of the respective predetermined rated currents of the n pieces of said respective output transistors is designed to be a rated out current from the common output terminal.

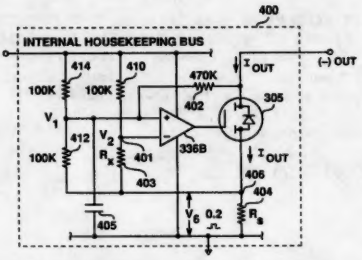
5,491,402

## APPARATUS AND METHOD FOR PROVIDING AC ISOLATION WHILE SUPPLYING DC POWER

**Kenneth T. Small, Cupertino, Calif., assignor to Echelon Corporation, Palo Alto, Calif.**

**Filed Jul. 20, 1993, Ser. No. 94,459**
**Int. Cl.[6] G05F** *1/40;* **H04M** *11/04*
**U.S. Cl. 323—282** **13 Claims**

**1**. In a communications network having a plurality of processors coupled by a first transmission line and a second transmission line, a method for interfacing a power source to said first transmission line and said second transmission line, wherein direct current power from said power source is conducted by said source power coupler to said first and said second transmission lines while alternating current on said first and said second transmission lines




is isolated from said power source by said source power coupler, said method comprising the steps of:

implementing an operational amplifier having a non-inverting input and an inverting input;

coupling a transistor to an output of said operational amplifier;

regulating an alternating current impedance between said power source and said one of said transmission lines;

maintaining an approximately constant direct current voltage across said transistor by coupling a capacitor between said non-inverting input of said operational amplifier and said power source and coupling a first resistor between said non-inverting input of said operational amplifier and said one of said transmission lines.

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**5,491,403**

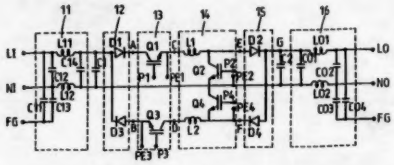
**ALTERNATIVE VOLTAGE STABILIZER FOR IMPROVING TRANSIENT RESPONSE AND INCREASING AREA OF VOLTAGE STABILIZED**

**Hui-Chi Lin, No. 2, Alley 2, Lane 637, Jong Jeng Rd., Jong Her City, Taipei Hsien, Taiwan, Prov. of China**

**Filed Mar. 30, 1995, Ser. No. 413,791**

**Int. Cl.[6] G05F *1/40***

**U.S. Cl. 323—282** **5 Claims**




**1**. An alternative voltage stabilizer capable of improving transient response and increasing area of stabilized voltage, includes:

a low pass input filter circuit: which is composed of a first and second inductors and a plurality of input capacitors, another capacitor is jumper connected at the output of the circuit, so as to prevent low frequency interference;

a wave dividing circuit: which divides input sinusoidal wave into positive and negative half cycles through two diodes parallelly connected with each other;

a voltage reducing and width modulating circuit: which is composed of two on-off transistors, the collector of the first transistor being connected to the cathode of one of said diodes, while the emitter of the other of the second transistor being connected to the anode of the other of said diodes, and the gates of said transistors being connected with outside input signals;

a voltage supplementing and width modulating circuit: a third inductor therein being connected to the collector of a third transistor, a fourth inductor is connected to the emitter of a fourth transistor, the emitter of said third transistor being connected to the collector of said fourth transistor, the gates of said another and said fourth transistor being respectively connected with outside input signals;

a wave recombining circuit: which recombines said divided wave forms and recovers them to be alternative waves by contrary phased disposing of a third and fourth diodes, the output of the wave circuit being jumper connected with a high frequency filter capacitor;

a low pass output filter: which is composed of third and fourth inductors and a plurality of output capacitors;

an error comparing circuit: which compares an alternative sinusoidal standard wave directly with feedback signals of an alternative voltage stabilizer for the error after an alternative sinusoidal standard wave generator oscillates to give a low distortioned alternative sinusoidal standard wave and supply power frequency reaches synchronism and phase lock, once said feedback signals having slight errors, it produces a correcting signals for the errors, said error correcting signals being compared by a comparator with a high frequency triangular wave signal generated by a high frequency triangular wave generator, and then a high frequency pulse width modulating signal changing fast in pursuance of a high and low values of said supply power being obtained;

said stabilizer is characterized in that:

the voltage of a alternative supply power is divided into positive and negative half cycles by a wave dividing circuit, then the error of the input voltage which is too high or too low is compared by said error comparing circuit to decide the level of voltage of said gates of all said transistors, or to input suitable high frequency pulse width modulating signals or reverse pulse width modulating signals of high frequency to supplement the overly low input voltage using said inductors and capacitors, or to reduce the overly high voltage, and lastly said divided wave forms are recombined and recovered to a rated alternative waves to render said alternative voltage stabilizer to keep in a state of stable voltage output.

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**5,491,404**

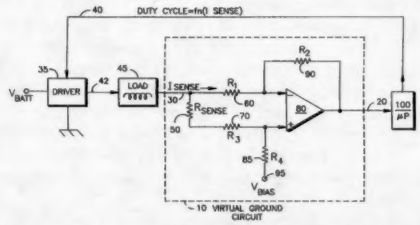
**CURRENT SENSE WITH VIRTUAL GROUND**

**Steven R. Settles, Sterling Hts., Mich., and Fady Tawil, Roseville, Minn., assignors to United Technologies Automotive, Inc., Dearborn, Mich.**

**Filed Feb. 8, 1994, Ser. No. 193,313**

**Int. Cl.[6] G05F *1/12***

**U.S. Cl. 323—283** **19 Claims**




**1**. A circuit for measuring current draw by a load and for adjusting current delivered to said load, said delivered current being generated by a driver having a variable duty cycle which varies in response to said current draw, said circuit including a power supply for providing a source of DC voltage, said circuit comprising:

a differential device having a negative and a positive input and having a differential output;

a sense resistor network shunted across said negative and positive inputs of said differential device having a sense current;

a bias resistor having a first and second connection point, said first connection point of said bias resistor coupled between said positive input of said differential device and said sense resistor network and said second connection point of said bias resistor coupled with said source of DC voltage to provide a virtual ground for said positive input of said differential device; and

a feedback resistor coupled between said differential output and said negative input of said differential device, whereby said

measured current draw is represented at said differential output as a signal ranging from a maximum value corresponding with the voltage of said source of DC voltage to a minimum value, the magnitude of said differential output being inversely proportional to the magnitude of said sense current.

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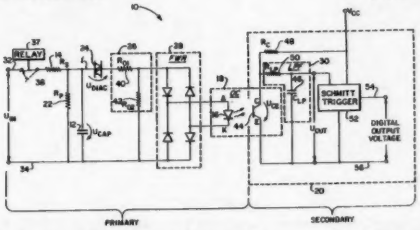
5,491,405

## LEVEL CONVERSION OF AC OR DC VOLTAGE WITH NOISE REJECTION AND LOW POWER CONSUMPTION

**Helmut L. Schröder-Brumloop, and Andreas O. F. Belkner, both of Berlin, Germany, assignors to Otis Elevator Company, Farmington, Conn.**

**Continuation of Ser. No. 984,781, Dec. 3, 1992, abandoned.**
**This application Jul. 28, 1994, Ser. No. 282,410**
**Int. Cl.[6] G05F *5/00***
**U.S. Cl. 323—299** **8 Claims**




1. A voltage level converter circuit for converting input signals having one voltage level into output signals having another voltage level, said voltage level converter circuit comprising an optical coupler having a primary circuit electrically isolated from a secondary circuit:

A) said primary circuit including

an oscillating circuit, responsive to said input signals having an input voltage waveform and said one voltage level, for providing pulsed input voltage signals, and

a light emitting means, responsive to said pulsed input voltage signals, for providing pulsed light signals; and

B) said secondary circuit including means, responsive to said pulsed light signals, for providing said output signals having an output voltage waveform substantially similar to the input voltage waveform,

whereby the voltage level converter circuit has a pulsed operation for consuming a reduced amount of power during voltage level conversion.

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5,491,406

## MEASURING RANGE ADAPTER

**Rainer Nicklis, Gleisweiler, Germany, assignor to Siemens Aktiengesellschaft, Müchen, Germany**

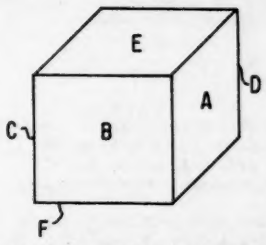
**PCT No. PCT/DE93/00211, § 371 Date Sep. 8, 1994, § 102(e) Date Sep. 8, 1994, PCT Pub. No. WO93/18411, PCT Pub. Date Sep. 16, 1993**
**PCT Filed Mar. 8, 1993, Ser. No. 295,889**
**Claims priority, application Germany, Mar. 11, 1992, 92 03 297.4**
**Int. Cl.[6] G01R *1/04;* H01R *29/00;* G01D *1/04***
**U.S. Cl. 324—115** **22 Claims**

1. A device for coupling signals to a pluggable module that forwards signals to a processing and/or peripheral unit, said device comprising:

a) at least one plug for mating with the pluggable module;

b) means for adjusting a measuring range of the device to a measuring range of the signals being provided;

c) means for mating the plug with the pluggable module in different ways; and




d) a first means for cooperating with a second means in said pluggable module such that the position of said plugged-in module when mated with the plug sets the measuring range of the device.

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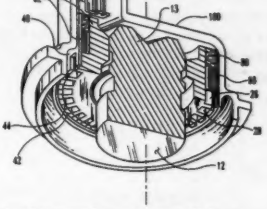
5,491,407

## WHEEL BEARING SPEED SENSOR

**William R. Maxson, Fort Wayne; Jerry D. Heiniger, Anderson, and James C. Rustman, Huntington, all of Ind., assignors to Kearney-National, Inc., White Plains, N.Y.**

**Filed Feb. 3, 1995, Ser. No. 383,079**
**Int. Cl.[6] G01P *3/488;* F16C *32/00***
**U.S. Cl. 324—174** **32 Claims**



1. A wheel bearing speed sensor comprising:

a vehicle axle spindle rotatable about an axis on a plurality of bearings within a wheel bearing housing;

all annular rotor mounted to said spindle for rotation therewith, one end of said rotor defining a plurality of teeth; and

a stator assembly fixed to said wheel bearing housing, said stator assembly including:

an annular stator having a plurality of teeth extending from one end thereof and an opposite end;

an annular bobbin member having a plurality of conductor windings around the periphery thereof, said bobbin member being slidably received within said stator between said stator teeth and said opposite end, said bobbin member having means cooperative with said stator to restrict axial movement of said bobbin member toward said stator teeth; and

a magnet received radially within said stator between said bobbin member and said opposite end, said magnet defining a magnetic pole along an outer surface thereof magnetically secured to an inner periphery of said stator adjacent said bobbin member to thereby restrict axial movement of said bobbin member toward said opposite end of said stator, said magnet defining an opposite pole along an inner surface thereof opposite said outer magnet surface;

wherein said rotor is axially received within said stator assembly such that said rotor teeth extend radially toward said stator teeth, and an opposite end of said rotor is positioned adjacent said inner magnet surface;

and wherein rotation of said rotor relative to said stator assembly causes said rotor teeth to alternately align and misalign with said stator teeth so that an alternating magnetic flux passing

around said bobbin member induces a corresponding alternating voltage in said conductor windings.

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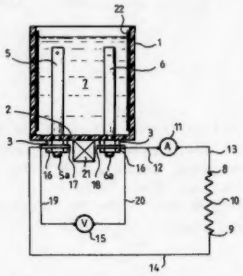
**5,491,408**

## DEVICE FOR DETECTING THE CHANGE OF VISCOSITY OF A LIQUID ELECTROLYTE BY DEPOLARIZATION EFFECT

**Alain Rousseau, Charenton le Pont, France, assignor to Serbio, France**

**Filed Jul. 18, 1991, Ser. No. 732,362**
**Claims priority, application France, Jul. 20, 1990, 90 09285**
**Int. Cl.[6] G01R** *27/26*
**U.S. Cl. 324—71.1** **12 Claims**




1. Device for detecting coagulation of a blood sample, comprising: an electrically insulating receptacle with two conducting electrodes of different metallic nature; means for generating a vibratory field inside the receptacle; means for measuring voltage variations between the electrodes, and for recording in the form of a curve said voltage variations as a function of a time; and at least one appropriate reagent deposited in at least a uniform layer on surfaces of the receptacle bathed by the blood sample for causing said coagulation.

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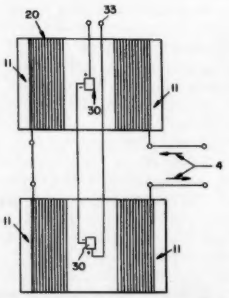
**5,491,409**

## MULTIPLE YOKE EDDY CURRENT TECHNIQUE FOR DETECTION OF SURFACE DEFECTS ON METAL COMPONENTS COVERED WITH MARINE GROWTH

**John H. Flora, and Hubert L. Whaley, both of Lynchburg, Va., assignors to The Babcock & Wilcox Company, New Orleans, La.**

**Filed Nov. 9, 1992, Ser. No. 973,515**
**Int. Cl.[6] G01R** *33/12;* **G01N** *27/82*
**U.S. Cl. 324—242** **18 Claims**




12. A device for detecting a defect on a metal component having a cover, the device comprising:

at least two magnetizing U-shaped yokes, each U-shaped yoke having a body supported by at least two legs, the legs for contacting the cover and supporting the body over the cover such that when the U-shaped yoke is placed on the cover of the component, a space is formed between the body, the legs and the cover, each U-shaped yoke being moveable about the cover;

an excitation coil wound around the body of each U-shaped yoke between the legs for receiving an alternating current and producing an alternating magnetic field through each U-shaped yoke thereby inducing an eddy current in the component parallel to a plane formed by said magnetic flux sensor underneath each U-shaped probe, the alternating magnetic field and the eddy current having a magnitude, a phase and a direction; and

at least one magnetic flux sensor located within the space of each U-shaped yoke, each of said magnetic flux sensors being differentially connected to another, said sensors detecting changes in the magnitude, the phase and the direction of the alternating magnetic field and the eddy current.

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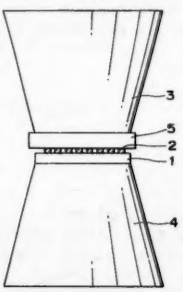
**5,491,410**

## SUPERCONDUCTING MAGNETIC SENSOR HAVING A FERROMAGNETIC ELEMENT FOR CONVERGING AN EXTERNAL MAGNETIC FIELD

**Hideo Nojima, Nara; Hidetaka Shintaku, Fujisawa; Masaya Nagata, Souraku; Manabu Fujimoto, Tenri, and Masayoshi Koba, Nara, all of, Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan**

**Filed Dec. 17, 1992, Ser. No. 993,241**
**Claims priority, application Japan, Dec. 20, 1991, 3-338430**
**Int. Cl.[6] G01R** *33/035;33/06*
**U.S. Cl. 324—248** **6 Claims**




1. A superconducting magnetic sensor comprising:

a substrate,

a continuous superconductive magnetoresistor formed on and in direct contact with the substrate,

the continuous superconductive magnetoresistor being comprised of a continuous ceramic superconductive film, and

a truncated cone shaped ferromagnetic element for converging an external magnetic field into the superconductive magnetoresistor operatively connected to the superconductive magnetoresistor, the ferromagnetic element having a substantial outer surface area for exposure to the external magnetic field, so that the sensor has a sensitivity level in the order of $10^{-7}$ gauss.

## 5,491,411

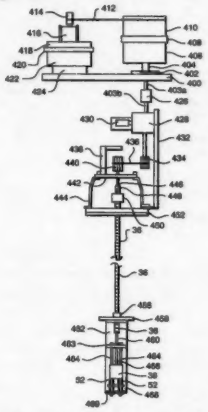
## METHOD AND APPARATUS FOR IMAGING MICROSCOPIC SPATIAL VARIATIONS IN SMALL CURRENTS AND MAGNETIC FIELDS

**Frederick C. Wellstood, College Park; Anna Mathai, University Park; Dian Song, Greenbelt, and Randall C. Black, Seabrook, all of Md., assignors to University of Maryland, College Park, Md.**

**Filed May 14, 1993, Ser. No. 61,102**

**Int. Cl.**[6] **G01R** *33/035;33/12;* **G01N** *27/72*

**U.S. Cl. 324—248** **24 Claims**



**1**. An apparatus for obtaining microscopic images of magnetic fields emanating from a sample, said sample being an object or specimen which is to be examined by said apparatus, said magnetic fields emanating from said sample, originating from said sample or being induced in said sample by means of an applied magnetic field, said images having a spatial resolution finer than 1 mm and said apparatus comprising:

a dewar;

at least one SQUID contained within said dewar, said SQUID having a loop or body being smaller than 1 mm and disposed within 1 mm of said sample;

a magnetic shield about said dewar;

a positioning assembly at least partially within said dewar and attached to said sample and said at least one SQUID, said sample being disposed in said dewar, and said positioning assembly for moving said sample and said at least one SQUID relative to each other while maintaining said SQUID within at least 1 mm of said sample, and for eliminating vibration which may affect said microscopic images having a spatial resolution finer than 1 mm;

means for controlling the movement of said positioning assembly; and means for monitoring voltage across at least one of said SQUIDs within said dewar to obtain microscopic images of magnetic fields emanating from said sample, said voltage being an output from at least one of said SQUIDs and being generated by at least one of said SOUIDs responding to said magnetic fields emanating from said sample.

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## 5,491,412

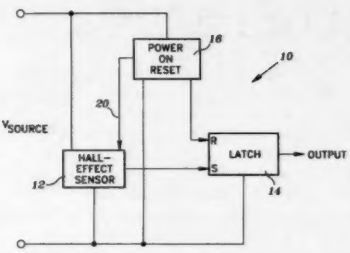
## SECURITY CIRCUIT WITH MAGNETIC PROXIMITY SENSOR HAVING A MAGNETIC SETTABLE AND ELECTRICAL RESETTABLE LATCHED OUTPUT

**Johnny R. Foster, Carrollton, Tex., assignor to Optek Technology, Inc., Carrollton, Tex.**

**Filed Jan. 24, 1994, Ser. No. 186,303**

**Int. Cl.**[6] **G01R** *33/06;* **G01N** *27/72;* **H03K** *17/90;19/18*

**U.S. Cl. 324—251** **2 Claims**



**1**. A security circuit for use with a voltage source comprising:

A Hall-effect sensor for generating an output signal in response to a sensed variation in the strength of a magnetic field proximate to said Hall-effect sensor and said Hall-effect sensor being adapted to be connected to a voltage source;

latch means for receiving said Hall-effect sensor output signal and for generating a latched output signal, said latch means operable between a set state and a reset state;

means for monitoring the voltage source independent of the magnetic field and for generating an output signal applied to said latch means when the voltage source is below a predetermined value; and

said latch means generating said latched output signal to said set state in response to said sensor output signal and said latch means generating said latched output signal to said reset state in response to said monitoring means output signal when the voltage source is below said predetermined value.

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## 5,491,413

## POSITIONING DEVICE FOR MAGNETIC HEAD AND DISK TESTER WITH ROTATING TOOL SUPPORT

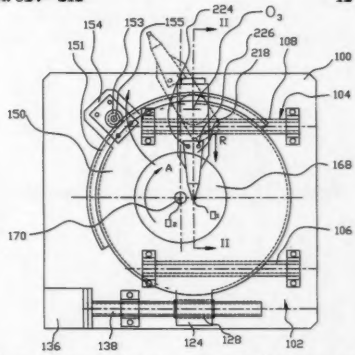
**Nahum Guzik, San Jose, Calif., assignor to Guzik Technical Enterprises, Inc., San Jose, Calif.**

**Filed Sep. 27, 1993, Ser. No. 127,684**

**The portion of the term of this patent subsequent to Oct. 19, 2010, has been disclaimed.**

**Int. Cl.**[6] **G01R** *33/12;* **G11B** *5/54;21/14*

**U.S. Cl. 324—212** **12 Claims**



**1**. A positioning device for a magnetic head and disk tester comprising:

a base plate,

a slide mechanism supported by said base plate and having slide means for enabling said slide mechanism to slide on said base plate in one direction,

a moveable housing supported by said slide mechanism and moveable with said slide mechanism;

said slide mechanism having a first drive means supported by said base plate for linearly displacing said moveable housing in said one direction,

a rotatable platform rotatably supported by said moveable housing, said rotatable platform having a geometrical center of rotation,

a second drive means supported by said moveable housing for rotating said rotatable platform around said geometrical center of rotation of said rotatable platform,

a rotary spindle rotatably supported by said base plate within the circumference of said rotatable platform,

said rotary spindle arranged to hold at least one magnetic disk for rotating with said spindle, said disk being of the type which has a plurality of read-write tracks for interaction with a plurality of read-write heads to be tested,

a tool support supported by said rotatable platform, said tool support having a center of rotation,

at least one magnetic head and attaching means for releasably attaching said magnetic head to said tool support,

pivot means for enabling said tool support to pivot with respect to said rotatable platform from (a) a working position in which said head is located in said center of rotation of said rotatable platform to (b) a head-replacement position in which said tool support is pivoted away from said working position to a position where said head is located away from said rotatable platform, and

locking means for (a) locking said tool support in said working position, or (b) releasing said tool support so that it can be pivoted to said head-replacement position.

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**5,491,414**

## METHOD OF NUCLEAR QUADRUPOLE RESONANCE TESTING OF INTEGRAL SPIN QUANTUM NUMBER SYSTEMS

**John A. S. Smith, London, England, and Julian D. Shaw, Encinitas, Calif., assignors to British Technology Group Limited, London, England**

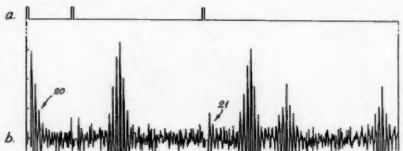
**PCT No. PCT/GB92/02254, § 371 Date Dec. 4, 1992, § 102(e) Date Dec. 4, 1992, PCT Pub. No. WO93/11441, PCT Pub. Date Jun. 10, 1993**

**PCT Filed Dec. 4, 1992, Ser. No. 244,487**

**Claims priority, application United Kingdom, Dec. 5, 1991, 9125883**

**Int. Cl.[6] G01R** *33/20*

**U.S. Cl. 324—307** **13 Claims**




1. A method of NQR testing which includes the steps of:

applying to a sample in which selected nuclei have an integral spin quantum number, a series of at least three excitation pulses of electromagnetic waves at a single radiofrequency to excite quadrupole resonance in said selected nuclei; and

detecting echo response signals from said sample at a plurality of times;

said series of at least three excitation pulses being arranged in time to generate a greater number of said echo response signals in a predetermined substance than a number of said at least three excitation pulses.

**5,491,415**

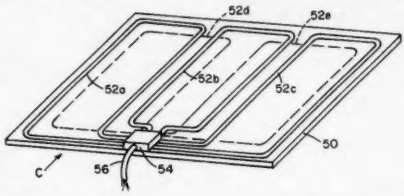
## MAGNETIC RESONANCE SCANNER WITH IMPROVED PACKAGING FOR CIRCUITRY WITHIN THE MAGNETIC FIELD

**Timothy B. Holmes, Solon, and Paul M. Scsavnicki, Mentor, both of Ohio, assignors to Picker International, Inc., Highland Hts., Ohio**

**Continuation-in-part of Ser. No. 847,796, Mar. 5, 1992, Pat. No. 5,296,813. This application Jan. 21, 1994, Ser. No. 186,297 The portion of the term of this patent subsequent to Mar. 22, 2011, has been disclaimed.**

**Int. Cl.[6] G01V** *3/00*

**U.S. Cl. 324—322** **18 Claims**




1. In a magnetic resonance apparatus which includes a means for creating a magnetic field through an examination region; a means for exciting nuclei of a subject within the examination region to emit radio frequency magnetic resonance signals; a radio frequency receiving coil means disposed closely contiguous to the examination region for receiving the magnetic resonance signals; a magnetic resonance signal processing circuit for processing the magnetic resonance signals received by the radio frequency receiving coil means; a radio receiver for receiving magnetic resonance signals from the resonance signal processing circuit, the receiver means being disposed outside of the examination region; a data reconstruction means operatively connected with the receiver means for processing the received data; a memory means for storing the processed data for selected display; THE IMPROVEMENT COMPRISING:

constructing the magnetic resonance signal processing circuit using one of chip and wire hybrid, flip chip, and tape automated bonding technology in which a plurality of ferrous-free unpackaged dice are mounted and bonded to a substrate having electrical lead lines defined thereon, the dice are bonded by one of whiskers, raised solder bumps, and conductive lead lines on flexible tape directly to electrically conductive layers of the dice and the substrate lead lines.

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**5,491,416**

## METHOD AND DEVICE FOR THE MEASURING AND MONITORING OF ELECTRICAL SPARK GAPS DURING OPERATION

**Jacob Klimstra, Twijzel, and Abraham De Voogd, Rotterdam, both of, Netherlands, assignors to Deltec Fuel Systems B.V., Netherlands**

**PCT No. PCT/NL92/00132, § 371 Date Jan. 13, 1994, § 102(e) Date Jan. 13, 1994, PCT Pub. No. WO93/02286, PCT Pub. Date Feb. 4, 1993**

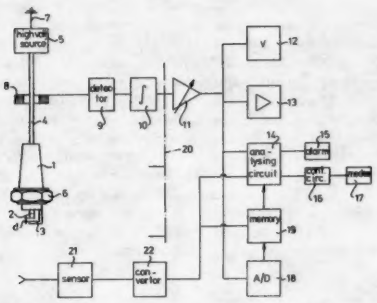
**PCT Filed Jul. 17, 1992, Ser. No. 185,990**

**Claims priority, application Netherlands, Jul. 17, 1991, 9101257**

**Int. Cl.[6] F02P** *17/12*

**U.S. Cl. 324—393** **17 Claims**

1. Method for monitoring, during operation, the performance of an electrical spark gap, in particular a spark plug of a combustion engine, which is connected to a device for generating electrical high voltage, wherein current arising during the flashover of the spark gap being detecting is converted into a measuring signal representative of the instantaneous operational condition of the spark gap, and analyzed, including the following steps:




establishing reference data representing an initial performance of the spark gap from the measuring signal obtained during an initial measurement and recording the reference data,

analyzing the instantaneous measuring signal as a function of the reference data, and

signaling discrepancies resulting from the analysis step between the instantaneous measuring signal and the recorded reference data.

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**5,491,417**

## SPARKPLUG VOLTAGE PROBE DEVICE HAVING A CAPACITANCE COMPENSATING FUNCTION FOR AN INTERNAL COMBUSTION ENGINE

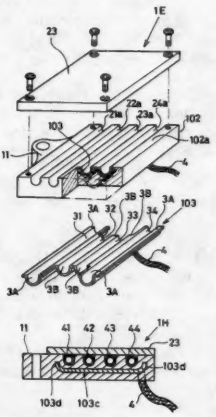
**Shigeru Miyata; Yoshitaka Yamada; Hideji Yoshida; Yoshihiro Matsubara, and Yasuo Ito, all of Nagoya, Japan, assignors to NGK Spark Plug Co., Ltd., Nagoya, Japan**

**Division of Ser. No. 982,822, Nov. 30, 1992, Pat. No. 5,426,370. This application Jun. 20, 1994, Ser. No. 262,653**

**Claims priority, application Japan, Nov. 28, 1991, 3-314783; Nov. 29, 1991, 3-316685; May 11, 1992, 4-117683; Nov. 13, 1992, 4-303859**

**Int. Cl.**[6] **F02P** *17/00;* **G01R** *19/165;1/06;215/003*

**U.S. Cl. 324—402** **5 Claims**




1. In a sparkplug voltage probe device which detects a voltage applied to each of sparkplugs installed in an internal combustion engine by way of corresponding cables so as to analyze a burning condition in the internal combustion engine on the basis of the voltage applied to each of the sparkplugs;

the sparkplug voltage probe device comprising:

an insulator base attached to the internal combustion engine, an upper surface of the insulator base having a plurality of grooves in which the corresponding cables are placed;

an electrode plate embedded in the insulator base along the grooves to form a static capacity between the electrode plate and an array of all the cables in the grooves, the electrode plate being geometrically adjusted toward any of the cables to smooth the static capacity so as to form a capacitance adjusting means, and thereby substantially even distribution of the static capacity static capacity so as to form a capacitance adjusting means, and thereby substantially even distribution of the static capacity between the electrode plate and the array of all the cables in a direction perpendicular to a length of the electrode plate; and

a lead wire provided to electrically connect the electrode plate to a microcomputer.

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**5,491,418**

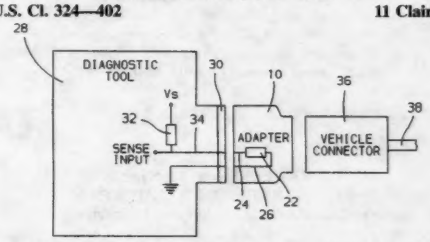
## AUTOMOTIVE DIAGNOSTIC COMMUNICATIONS INTERFACE

**Enrique J. Alfaro, West Bloomfield, Mich., and Erwin Frank, Bischofsheim, Germany, assignors to General Motors Corporation, Detroit, Mich.**

**Filed Oct. 27, 1994, Ser. No. 330,539**

**Int. Cl.**[6] **B60L** *1/00;* **F02P** *17/00*

**U.S. Cl. 324—402** **11 Claims**




3. An automotive vehicle diagnostic communications interface across which a diagnostic tool having a tool connector communicates with electronic devices of a predetermined plurality of automotive vehicle classes, wherein each of the predetermined plurality is characterized by a particular vehicle diagnostic connector, comprising:

a plurality of connector adapters each of which plurality is particular to a one of the plurality of automotive vehicle classes for providing a diagnostic communication connection between the particular vehicle diagnostic connector characteristic of such class and the tool connector;

sensing circuitry included with the diagnostic tool for sensing, when the diagnostic communication connection has been provided, the connector adapter providing the diagnostic communication connection; and

a controller included with the diagnostic tool responsive to the sensed connector adapter for identifying the one of the predetermined plurality of automotive vehicle classes to which the sensed connector adapter is particular.

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**5,491,419**

## ASSEMBLY FOR RAPID AND ACCURATE TESTING OF ENCAPSULATED DEVICES

**Nidal Kerdiya, Garden Grove, and Richard L. Andes, Redondo Beach, both of Calif., assignors to Teledyne Industries, Inc., Los Angeles, Calif.**

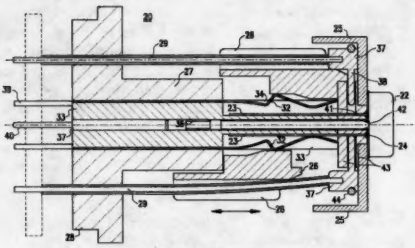
**Filed Oct. 8, 1993, Ser. No. 134,093**

**Int. Cl.**[6] **G01R** *31/02;31/327*

**U.S. Cl. 324—418** **8 Claims**

1. A test assembly for encapsulated electrical devices comprising a generally-cylindrical body portion,

the body portion containing a plurality of channels extending in a direction paralleling a cylindrical axis of the body



portion through the body portion from one end of the body portion toward an opposite end,

conductive terminals extending outward from the body portion,

a first plurality of spring contacts, one spring contact positioned in each of the channels providing a conductive path to one of the conductive contacts,

a second plurality of spring contacts, each of the second plurality of spring contacts providing a measuring path to one of the conductive contacts for a high impedance testing device, and

means for urging each of the first plurality of spring contacts and each of the second plurality of spring contacts into conductive contact with a lead from any encapsulated electrical device placed in a channel, the first plurality of spring contacts adapted to contact a lead at a first distance from the device, and the second plurality of spring contacts adapted to contact a lead at a second distance from the device.

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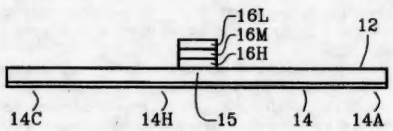
**5,491,420**

**BATTERY TESTER WITH STACKED THERMOCHROMIC ELEMENTS**

**Robert Parker, Alamo, Calif., assignor to Duracell Inc., Bethel, Conn.**

**Filed Mar. 1, 1993, Ser. No. 24,423**
**Int. Cl.[6] G01R** *27/26*
**U.S. Cl. 324—435** **34 Claims**




**1**. A thermochromic apparatus for testing an electrical battery source having a anode terminal and a cathode terminal, comprising:

a dielectric substrate having a single test site thereon;

conductive means on the substrate for conducting a test current from the battery source during testing;

anode contact means for electrical connection of said conductive means to the anode terminal of the battery source and

cathode contact means for electrical connection of said conductive means to the cathode terminal of the battery source;

a resistive heater means formed by a segment of the conductive means proximate the single test site for generating heat in response to the test current therethrough which raises the temperature of the single test site from an initial temperature to a higher temperature determined by the resistive heater means and the test status of the battery source, the segment of the conductive means forming the resistive heater means having a constant width for producing a substantially constant temperature throughout the entire test site (the test temperature);

at least two thermochromic layers stacked on said substrate at said test site, a first thermochromic layer over a second thermochromic layer, said thermochromic layers being stacked at the test site so that the second thermochromic layer is closer to the test site on the substrate than is the first thermochromic layer, whereby during battery testing the first thermochromic layer is closer to the viewer than the second thermochromic layer,

said first thermochromic layer being of a first color which is generally opaque at said initial temperature, and clear at a test temperature (**T1**) which is greater than the initial temperature thereby revealing the color of the second thermochromic layer to indicate that the battery source is at least partially operable;

said second thermochromic layer being of a second color which is generally opaque at said initial temperature and **T1**, and clear at a test temperature (**T2**) which is greater than **T1** thereby revealing the color of a layer of material therebelow to indicate that the battery source is stronger than if only the first thermochromic layer had cleared.

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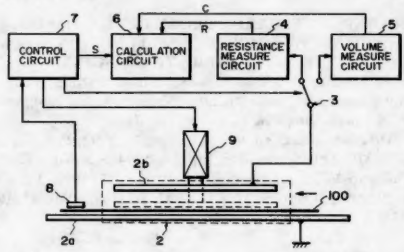
**5,491,421**

**SHEET THICKNESS MEASURING APPARATUS WHICH MEASURES SHEET THICKNESS BASED ON CALCULATED CAPACITY AND RESISTENCE VALUES OF THE SHEET**

**Ichiro Katsuie, Takasaki, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan**

**Filed Dec. 23, 1993, Ser. No. 172,107**
**Claims priority, application Japan, Dec. 26, 1992, 4-359189**
**Int. Cl.[6] G01N** *27/02;* **G01B** *7/06*
**U.S. Cl. 324—452** **13 Claims**




**1**. A sheet thickness measuring apparatus comprising:

electrostatic capacity measuring means for measuring the electrostatic capacity of a sheet;

resistance measuring means for measuring a resistance value of the sheet; and

calculation means for calculating a thickness of the sheet on the basis of the electrostatic capacity measured by said electrostatic capacity measuring means and the resistance value measured by said resistance measuring means.

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**5,491,422**

**LINEAR POSITION SENSOR USING A COAXIAL RESONANT CAVITY**

**Ali A. Bitar, Peoria, Ill.; Charles W. Bowman, Escondido, and Denny E. Morgan, San Diego, both of Calif., assignors to Caterpillar Inc., Peoria, Ill.**

**Division of Ser. No. 108,552, Dec. 23, 1991, Pat. No. 5,438,274. This application Mar. 14, 1995, Ser. No. 403,599**
**Int. Cl.[6] G01R** *27/04;* **F15B** *13/16*
**U.S. Cl. 324—636** **6 Claims**

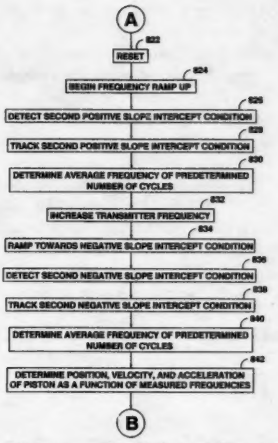
**1**. A method for detecting a linear position of a piston (**104**) and a piston rod (**106**) being movable within a housing (**110**) of a hydraulic cylinder (**108**), including the steps of:

producing an electromagnetic signal having a frequency varying between minimum and maximum values;

delivering said electromagnetic signal into said hydraulic cylinder (**108**);

receiving electromagnetic wave signals from said hydraulic cylinder (**108**);

detecting a first positive slope intercept condition;




tracking the frequency of said first positive slope intercept condition and responsively producing a first frequency signal;

detecting a first negative slope intercept condition;

tracking the frequency of said first negative slope intercept condition and responsively producing a second frequency signal;

detecting a second positive slope intercept condition;

tracking the frequency of said second positive slope intercept condition and responsively producing a third frequency signal;

detecting a second negative signal slope intercept condition;

tracking the frequency of said second negative slope intercept condition and responsively producing a fourth frequency signal;

receiving said frequency signals and responsively determining the position, velocity and acceleration of said piston and piston rod (**104**,**106**).

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**5,491,423**

## DEVICE FOR DETECTING THE PRESENCE OF A FOOD CONTAINER, SUCH AS A SAUCEPAN, DISH OR THE LIKE, ON A GLASS CERAMIC COOKING HOB

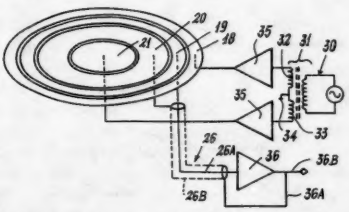
**Daniele Turetta, Ispra, Italy, assignor to Whirlpool Europe B.V., Veldhoven, Netherlands**

**Filed Mar. 11, 1994, Ser. No. 212,525**

**Claims priority, application Italy, Mar. 15, 1993, MI93A0494**

**Int. Cl.**[6] **G01R** *27/26*

**U.S. Cl. 324—663** **5 Claims**




**1**. A device for detecting the presence of a food container, placed on a cooking region of a hob of glass ceramic, below which there is positioned in correspondence with this region at least one heating element, said device comprising detection means positioned in correspondence with said cooking region below the glass ceramic hob and interposed between conductor means through which first electrical signals flow, said detection means generating second electrical signals at least one characteristic of which varies on the basis of the presence or absence of the container on said region, said second electrical signals being fed to heating element control means which, on the basis of the variation in the aforesaid characteristic, at least partly modify the state of activation of said heating element;

the detection means and conductors are elements arranged side by side on a support member positioned below the cooking region;

the elements on the support member are concentric annular elements, the most outer and most inner element being fed electrically by feed means, the detection means including an intermediate ring acting as a sensor member, said outer and inner annular elements defining a flat capacitor; and

the feed means are an oscillating voltage generator member, which is connected to a transformer member having two secondary windings connected at a common end to earth and at each other end to electrical means of high output impedance, said electrical means being connected to the outer annular element and to the inner annular element respectively, said outer and inner annular elements being fed with electrical signals which are identical except for one characteristic.

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**5,491,424**

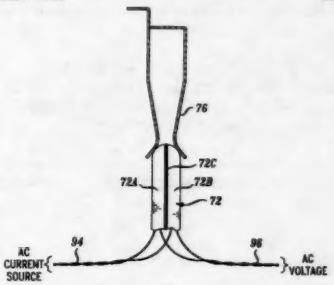
## SYSTEM FOR MEASURING CONTAMINATION RESISTANCE

**Madhu P. Asar, and Harry L. Maddox, both of Reynoldsburg, Ohio, assignors to AT&T Corp., Murray Hill, N.J.**

**Filed Aug. 12, 1994, Ser. No. 289,716**

**Int. Cl.**[6] **G01R** *27/14*

**U.S. Cl. 324—715** **18 Claims**




**1**. In an electronic apparatus that tests contamination resistance of electrical contacts contained in a connector assembly mounted to a printed circuit board (PCB), the improvement comprising:

probe means for engaging said contacts, the probe means comprising a first and second conductive probe segment that form a sandwich about a layer of insulating material;

constant current source of alternating current (AC) applied across the first and second probe segments;

means for amplifying and rectifying the AC voltage developed across the first and second probe setments in response to said constant current applied across said first and second probe segments to produce a direct current (DC) voltage proportional to the resistance at the contact engaged by the probe means;

memory means for storing data corresponding to the DC voltage measured by the probe means for a clean contact, said data representing the total bulk resistance associated with the apparatus and the clean contact;

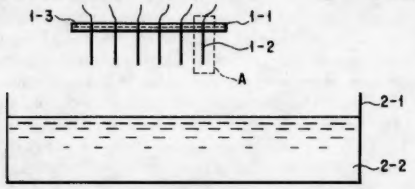
means for subtracting the bulk resistance from the resistance represented by the DC voltage of a contact under test in order to determine the contamination resistance.

## 5,491,425

## APPARATUS FOR EVALUATING CHARACTERISTICS OF SEMICONDUCTOR DEVICE AND METHOD OF EVALUATING CHARACTERISTICS OF SEMICONDUCTOR DEVICE USING THE SAME

**Toru Watanabe, Hopewell Junction, N.Y.; Yuri Yonekura, Kawasaki, Japan, and Katsuya Okumura, Poughkeepsie, N.Y., assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan**

**Filed Mar. 22, 1994, Ser. No. 215,774**
**Claims priority, application Japan, Apr. 19, 1993, 5-091270**
**Int. Cl.[6] G01R** *1/06*
**U.S. Cl. 324—754** **17 Claims**




**12**. A method of evaluating characteristics of first and second semiconductor devices by utilizing a needle-like probe having a first and second end, comprising the steps of:

electrically connecting said second end of said probe to a measuring device;

forming a drop of a molten metal at a tip portion of said first end of said probe situated at a position corresponding to a position of an electrode of the first semiconductor device to be measured;

bringing said drop of the molten metal into contact with said electrode of the first semiconductor device, and electrically connecting said first semiconductor device and said probe;

applying an electric signal to the first semiconductor device and evaluating the characteristics of the first semiconductor device;

increasing the temperature of the molten metal;

bringing said drop of the molten metal into contact with said electrode of the second semiconductor device, and electrically connecting said second semiconductor device and said probe; and

applying an electric signal to the second semiconductor device and evaluating the characteristics of the second semiconductor device.

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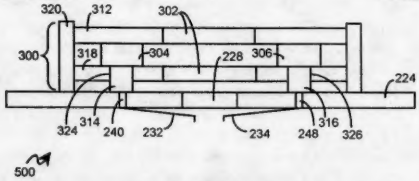
## 5,491,426

## ADAPTABLE WAFER PROBE ASSEMBLY FOR TESTING ICS WITH DIFFERENT POWER/GROUND BOND PAD CONFIGURATIONS

**Gary L. Small, Los Gatos, Calif., assignor to VLSI Technology, Inc., San Jose, Calif.**

**Filed Jun. 30, 1994, Ser. No. 269,798**
**Int. Cl.[6] G01R** *1/02*
**U.S. Cl. 324—754** **7 Claims**




**1**. A probe card assembly useful for testing, in conjunction with an integrated circuit tester having a plurality of test channels, an integrated circuit die having a plurality of bond pads including at least one ground bond pad and at least one power bond pad defining a power and ground bond pad configuration for said integrated circuit die, said probe card assembly comprising:

a probe card having a plurality of needles and a plurality of signal contacts, each needle contacting a respective bond pad of said integrated circuit die, and each signal contact connecting one of said plurality of needles to a corresponding one of said plurality of test channels of said integrated circuit tester, wherein a needle contacting a ground bond pad of said integrated circuit die is referred to as a ground needle, and a signal contact connecting said ground needle to a corresponding one of said plurality of test channels of said integrated circuit tester is referred to as a ground contact; and

a decoupling apparatus mounted on said probe card, and configured for the power and ground bond pad configuration of said integrated circuit die, said decoupling apparatus having a ground bus and at least one ground chip capacitor positioned directly over a corresponding ground contact of said probe card such that said ground chip capacitor is connected at one end to said ground bus and at another end through a conductive ground contact, to said corresponding ground contact of said probe card.

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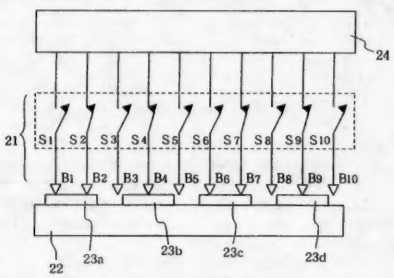
## 5,491,427

## PROBE AND ELECTRICAL PART/CIRCUIT INSPECTING APPARATUS AS WELL AS ELECTRICAL PART/CIRCUIT INSPECTING METHOD

**Toshiaki Ueno, and You Kondoh, both of Yokohama, Japan, assignors to Hewlett-Packard Company, Palo Alto, Calif.**

**Filed Aug. 10, 1994, Ser. No. 288,514**
**Claims priority, application Japan, Aug. 21, 1993, 5-228263**
**Int. Cl.[6] G01R** *31/02*
**U.S. Cl. 324—754** **6 Claims**




**1**. An apparatus for probing semiconductor devices having terminal comprising:

a substrate (**1**) having a surface;

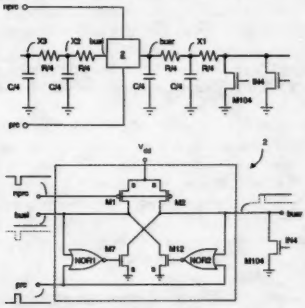
probe electrodes (B) disposed on the surface of the substrate, wherein the electrodes are arranged on the surface of the substrate in a plurality of columns for probing the semiconductor device, each probing column extending outwardly from a central portion of the substrate surface towards a perimeter of the substrate surface; and

means (**6**; **S1–S10**; S) for electrically coupling probe electrodes with a test system in such a way so as to provide the devices to be probed with a selection of more than two arrangements in which device terminals contacting the probe electrodes are not shorted with each other by the coupling means, wherein the coupling means includes a plurality of line patterns (**6**), each line electrically interconnecting the electrode of a respective one of the probing columns, wherein the probe electrodes are arrayed in a grid pattern at contacting regions with the device to be probed by a signal path switching means (**S1-S10**; S), and wherein said probe electrode and signal path switching means are both formed on the substrate.

## 5,491,428
## BUS-ISOLATING PRE-CHARGE BUFFER

**Michael Pan, Cupertino, Calif., assignor to Hitachi Microsystems, Inc., Santa Clara, Calif.**

**Filed Dec. 20, 1993, Ser. No. 170,052**
**Int. Cl.[6] H03K** *19/017*
**U.S. Cl. 326—17** **16 Claims**



**1**. In a system having a capacitively loaded bus coupled to be pulled up to a first logic level in response to a precharge signal during a precharge mode and to be pulled down to a second logic level by a load device, a method for reducing discharge current required to pull said bus down to said second logic level, the method comprising the steps of:

(a) dividing said bus into first and second bus segments that are electrically isolated from each other;

(b) coupling each said bus segment to be pulled up to said first logic level in said precharge mode; and

(c) coupling each said bus segment by coupling devices each having a first input coupled to said precharge sijgnal a second input coupled to one of said bus segments and an output coupled to the other of second bus segment such that either may be pulled down to said second logic level by said load device, whereupon the remaining said bus segment is also pulled down to said second logic level;

wherein said step of dividing reduces equivalent load capacitance presented to each said bus segment and required to be discharged by said load device when pulling said bus segment down to said second logic level.

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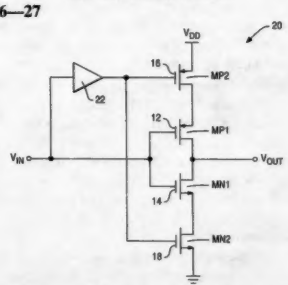
## 5,491,429
## APPARATUS FOR REDUCING CURRENT CONSUMPTION IN A CMOS INVERTER CIRCUIT

**Frank Gasparik, Monument, Colo., assignor to AT&T Global Information Solutions Company, Dayton, Ohio; Hyundai Electronics America, Milpitas, Calif., and Symbios Logic Inc., Fort Collins, Colo.**

**Filed Sep. 16, 1994, Ser. No. 307,111**
**Int. Cl.[6] H03K** *19/003*
**U.S. Cl. 326—27** **2 Claims**



**1**. A circuit for reducing power consumption, comprising:

an inverter comprising a p-channel and n-channel transistor, said inverter having an input and output;

a buffer having an input and output, the buffer input being coupled to the inverter input;

a second p-channel transistor having its gate coupled to the buffer output, its source coupled to a supply voltage, and its drain coupled to the inverter p-channel's drain.

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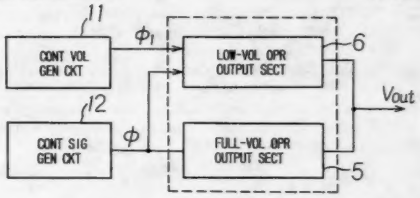
## 5,491,430
## SEMICONDUCTOR INTEGRATED CIRCUIT DEVICE WITH DATA OUTPUT CIRCUIT

**Eiichi Makino, and Masaru Koyanagi, both of Yokohama, Japan, assignors to Kabushiki Kaisha Toshiba, Kanagawa, Japan**

**Filed May 13, 1994, Ser. No. 242,714**
**Claims priority, application Japan, May 15, 1993, 5-136867; Apr. 22, 1994, 4-085074**
**Int. Cl.[6] H03K** *19/0185*
**U.S. Cl. 326—33** **14 Claims**




**1**. A semiconductor integrated circuit device, comprising:

a first reference voltage generating circuit supplied with an external supply voltage, for generating a first reference voltage having a first constant level within a predetermined power supply voltage range;

a second reference voltage generating circuit supplied with an external supply voltage, for generating a second reference voltage having a second constant level within a predetermined power supply voltage range;

a control voltage generating circuit for outputting a control voltage changing substantially in an analog manner according to a difference between the first reference voltage generated by said first reference voltage generating circuit and the second reference voltage generated by said second reference voltage generating circuit;

a data output control circuit for outputting a data signal used for outputting data; and

an output circuit for receiving the control voltage outputted by said control voltage generating circuit and the data signal outputted by said data output control circuit, and for outputting data according to the data signal in such a way that driving capability of said output circuit is controlled in an analog manner on the basis of the control voltage according to the external supply voltage,

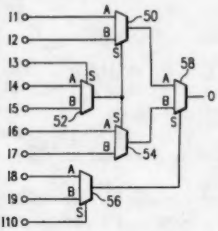
wherein said output circuit comprises a low-voltage operating output section and a full-voltage operating output section connected in parallel to each other between an external supply voltage terminal and an output terminal; the low-voltage operating output section receives the control voltage and the data signal, and outputs data according to the received data signal in such a way that the driving capability is high when the external supply voltage is lower than a predetermined value but reduces gradually when the external supply voltage is higher than the predetermined value; and the full-voltage operating output section receives the data signal, and outputs data according to the received data signal.

## 5,491,431

## LOGIC MODULE CORE CELL FOR GATE ARRAYS

**Mitra Nasserbakht, Dallas, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.**

**Filed Oct. 5, 1994, Ser. No. 318,322**
**Int. Cl.[6] H03K** *19/173*
**U.S. Cl. 326—38** **6 Claims**




**1**. A logic module core cell for performing a plurality of logic functions comprising, in combination:

a first, second, third, fourth and fifth multiplexer circuit, each multiplexer circuit with a first and a second data input and a selector input for selecting which said data input is gated to the multiplexer output;

said first multiplexer circuit having its first and second data input comprise a first and second logic module input;

said second multiplexer circuit having its first and second data input and its selector input comprise a third, fourth and fifth logic module input

said third multiplexer circuit having its first and second data input comprise a sixth and seventh logic module input;

said fourth multiplexer circuit having its first and second data input and its selector input comprise a eighth, ninth and tenth logic module input;

the output of said second multiplexer circuit being connected to the selector input to said first and third multiplexer; and

the output of said first and third multiplexer circuit being connected respectively to said first and second data input to said fifth multiplexer circuit, the output of said fourth multiplexer being connected to the selector input to said fifth multiplexer circuit the output of said fifth multiplexer circuit comprising the output of said logic module.

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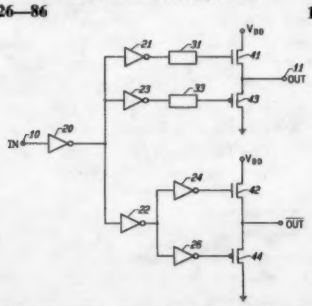
## 5,491,432

## CMOS DIFFERENTIAL DRIVER CIRCUIT FOR HIGH OFFSET GROUND

**Anthony Y. Wong, Saratoga; Eric Chan, Fremont; Brian Cheung, and Daniel Wong, both of San Jose, all of Calif., assignors to LSI Logic Corporation, Milpitas, Calif.**

**Filed Aug. 7, 1992, Ser. No. 927,097**
**Int. Cl.[6] H03K** *19/0185;19/0948*
**U.S. Cl. 326—86** **10 Claims**




**1**. A CMOS driver circuit for differentially driving a pair of transmission lines at a first terminal in response to a signal on an input terminal for reception of said signal at a second terminal, said driver circuit comprising

two pairs of drive transistors, each drive transistor having first and second source/drains and a gate, each drive transistor pair connected to one of said transmission line pair and having

a NMOS drive transistor having a drain connected to a first voltage supply, a source connected to an output terminal connected to said one transmission line,

a PMOS drive transistor having a drain connected to a second voltage supply, said second voltage supply at a lower voltage than said first voltage supply, and a source connected to said output terminal and said one transmission line; and

digital logic means connected to said input terminal and to gates of said drive transistors, said digital logic means generating complementary signals for differential operation of said two pairs of drive transistors so that said NMOS transistor or said PMOS transistor of each driver transistor pair is alternatively turned on responsive to a signal on said input terminal, and including means for synchronizing said complementary signals on gates of said driver transistors;

whereby signals on each transmission line operate in a narrowed voltage range with respect to said first and second voltage supplies for immunity from an offset in level of one of said voltage supplies at said second terminal.

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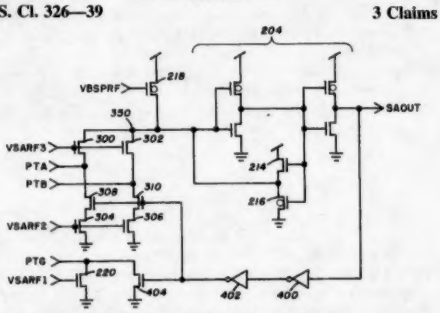
## 5,491,433

## CASCODE ARRAY CELL PARTITIONING FOR A SENSE AMPLIFIER OF A PROGRAMMABLE LOGIC DEVICE

**Bradley A. Sharpe-Geisler, San Jose, Calif., assignor to Advanced Micro Devices, Inc., Sunnyvale, Calif.**

**Division of Ser. No. 34,537, Mar. 19, 1993. This application May 18, 1995, Ser. No. 444,306**
**Int. Cl.[6] H03K** *3/037*
**U.S. Cl. 326—39** **3 Claims**




**1**. A programable array logic device comprising:

a plurality of programable array cells;

a sense amplifier comprising:

an amplifier having an amplifier input and an amplifier output;

a current source coupled to the amplifier input;

a product term A line coupled to a first plurality of array cells in the plurality of array cells;

a product term B line coupled to a second plurality of array cells in the plurality of array cells;

a first cascode having a current path coupled on a first end to the current source and the amplifier input and coupled on a second end to the product term A line, wherein a gate of the first cascode is supplied with a gate voltage to turn off the first cascode when a voltage on the product term A line is within a predetermined voltage range from a voltage on the amplifier input; and

a second cascode having a current path coupled on a first end to the current source and the amplifier input and coupled on a second end to the product term B line, wherein a gate of the second cascode is supplied with a gate voltage to turn off the first cascode when a voltage on the product term B

line is within a predetermined voltage range from a voltage on the amplifier input; and

an output logic macro cell coupled to receive an output signal from the sense amplifier, the output logic macro cell being programable to select whether an output of the programable logic device will be registered or combinatorial.

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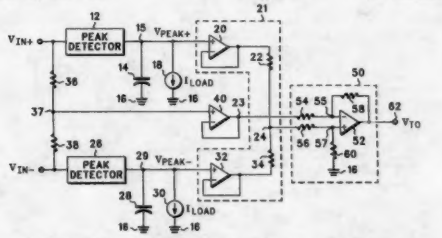
## 5,491,434
## CIRCUIT AND METHOD OF DIFFERENTIAL AMPLITUDE DETECTION

**David B. Harnishfeger, Chandler, and Michael J. Pennell, Phoenix, both of Ariz., assignors to Motorola, Inc., Schaumburg, Ill.**

**Filed Dec. 5, 1994, Ser. No. 349,331**
**Int. Cl.[6] H03D *1/00*; G01R *19/00***
**U.S. Cl. 327—50** **19 Claims**




1. A differential amplitude detection circuit, comprising:

a first peak detector circuit having an input coupled for receiving a first component of a differential input signal and having an output for providing a first peak signal;

a second peak detector circuit having an input coupled for receiving a second component of said differential input signal and having an output for providing a second peak signal;

a first current load circuit coupled to said output of said first peak detector circuit for tracking a decreasing offset component of said first component of said differential input signal;

a second current load circuit coupled to said output of said second peak detector circuit for tracking a decreasing offset component of said second component of said differential input signal; and

a summing circuit having first and second inputs respectively coupled for receiving said first and second peak signals and having an output coupled to an output node of the differential amplitude detection circuit for providing a signal representative of an amplitude of said differential input signal.

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## 5,491,435
## DATA SENSING CIRCUIT WITH ADDITIONAL CAPACITORS FOR ELIMINATING PARASITIC CAPACITANCE DIFFERENCE BETWEEN SENSING CONTROL NODES OF SENSE AMPLIFIER

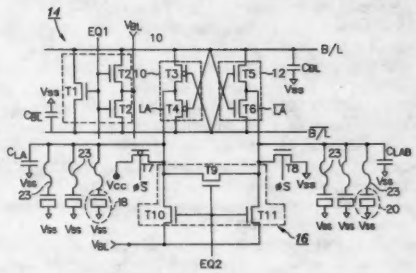
**Zin-Suk Mun, and Myung-Ho Bae, both of Kyungki, Rep. of Korea, assignors to Samsung Electronics Co., Ltd., Suwon, Rep. of Korea**

**Filed Nov. 17, 1994, Ser. No. 341,086**
**Claims priority, application Rep. of Korea, Nov. 17, 1993, 24484/1993**
**Int. Cl.[6] G01R *19/00***
**U.S. Cl. 327—55** **5 Claims**

1. A data sensing circuit for a semiconductor memory device having complementary bit lines, comprising:

a PMOS sense amplifier connected between the complementary bit lines, said PMOS sense amplifier having a sensing control node;

an NMOS sense amplifier connected between the complementary bit lines, said NMOS sense amplifier having a sensing control node;




a bit line equalization and precharge circuit connected between the complementary bit lines;

a sense amplifier equalization and precharge circuit connected between said sensing control nodes of said PMOS and NMOS sense amplifiers;

a plurality of first fuses each having a first end connected to said sensing control node of said NMOS sense amplifier, and a second end;

a plurality of second fuses each having a first end connected to said sensing control node of said PMOS sense amplifier, and a second end;

a plurality of first capacitors connected to said second end of respective ones of said first fuses;

a plurality of second capacitors connected to said second end of respective ones of said second fuses; and,

wherein selected ones of said first and/or second fuses can be selectively blown to thereby couple selected ones of said first and/or second capacitors to said sensing control nodes of said PMOS and NMOS sense amplifiers, respectively, to thereby equalize the capacitances of said sensing control nodes of said PMOS and NMOS sense amplifiers, even when said sensing control nodes of said PMOS and NMOS sense amplifiers have different parasitic capacitances.

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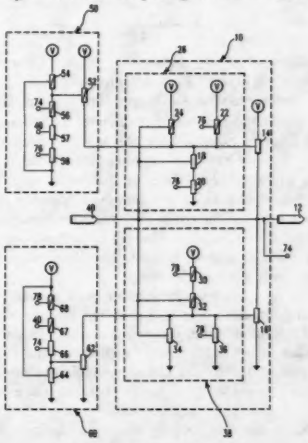
## 5,491,436
## COMPENSATED CMOS DRIVER CIRCUIT WITH REDUCED DC LOSSES

**John S. Austin, Essex Junction, Vt., assignor to International Business Machines Corp., Armonk, N.Y.**

**Filed Jul. 29, 1994, Ser. No. 282,835**
**Int. Cl.[6] H03K *17/14***
**U.S. Cl. 327—108** **11 Claims**

1. An integrated circuit comprising at least a first FET device



and a second FET device and a third FET device,

and wherein a given performance characteristic of each of said first and second FET devices varies in the same manner with variation of at least one performance related variable condition,

each of said first and second FET devices have an output signal at least one characteristic of which is changed by a change in said performance related variable condition,

the output signals of said first and said second FET devices being merged, wherein said one output characteristic of said second FET device acts in opposition to said one output characteristic of said first FET device;

said second FET device being constructed to be more responsive to said variations in said performance related variable condition than said first FET device and being constructed to have a weaker output signal than said first FET device whereby the merged output signal of said first and second FET devices is maintained relatively consistent irrespective of variations in the performance related variables condition, and

a voltage divider controlling said second FET device, said voltage divider including said third FET device, and said third FET device being coupled to the merged output signals of said first and said second FET devices to turn off both said voltage divider and said second FET device when said merged output signal rises to a select level.

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**5,491,437**

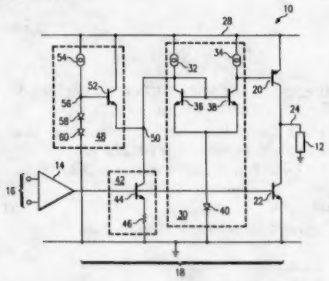
## AMPLIFIER CIRCUIT AND METHOD

**Gabriel A. Rincon, Margate, Fla.; Nicolas Salamina, and Marco Corsi, both of Dallas, Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.**

**Filed Dec. 1, 1994, Ser. No. 349,095**

**Int. Cl.[6] H03K** *1/0;* **G06G** *7/12;* **H03G** *3/45;* **G05F** *3/16*

**U.S. Cl. 327—108** **20 Claims**




1. An output stage of an amplifier circuit having an input amplifier stage, said output stage comprising:

circuitry operable to source an output current to an external load;

circuitry coupled to said sourcing circuitry and operable to sink current from the external load, said sourcing circuitry and said sinking circuitry having a common output node;

mirroring circuitry responsive to the input amplifier stage, coupled to said sinking circuitry and operable to approximately mirror the current in said sinking circuitry;

a current balancing circuit responsive to said mirroring circuitry and coupled to control current flow through said sourcing circuitry over a prescribed range;

said mirroring circuitry operable to draw current from said balancing circuit in response to a first predetermined output from the input amplifier stage such that said balancing circuit causes an insignificant current to flow in said sourcing circuitry and said mirroring circuit operable to cause said sinking circuit to sink a significant current from the external load; and

said mirroring circuitry operable to draw an insignificant current from said balancing circuit in response to a second predetermined output from the input amplifier stage such that said balancing circuit causes a significant current to flow in said sourcing circuitry.

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**5,491,438**

## SYNCHRONIZED CLOCK GENERATING APPARATUS

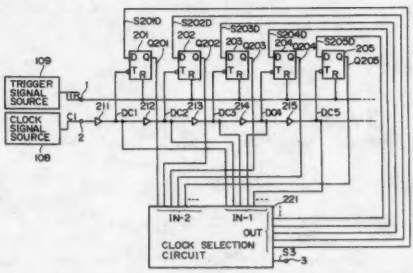
**Yukio Miyazaki; Takenori Okitaka; Makoto Hatakenaka, and Junji Mano, all of Itami, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan**

**Continuation of Ser. No. 809,007, Dec. 17, 1991, abandoned. This application Aug. 12, 1994, Ser. No. 289,837**

**Claims priority, application Japan, Dec. 26, 1990, 2-406357; Aug. 1, 1991, 3-193033; Nov. 11, 1991, 3-293988**

**Int. Cl.[6] H03L** *7/00*

**U.S. Cl. 327—144** **14 Claims**




1. A synchronized clock generating apparatus comprising:

a delayed clock generating circuit;

said delayed clock generating circuit including a clock input having a basic clock signal applied thereto;

said delayed clock generating circuit including further a plurality of delaying elements connected in series;

said plurality of delaying elements being effective for producing a plurality of delayed clock signals each successively delayed relative to said basic clock signal;

a plurality of flip-flops, each having a respective one of said plurality of delayed clock signals applied to a first input thereof;

said plurality of flip-flops each having a second input with a trigger signal, asynchronous with said basic clock signal, applied thereto;

each of said plurality of flip-flops having a third input and a flip-flop output;

said plurality of flip-flops receiving said trigger signal and said delayed clock signals such that each flip-flop, of said plurality of flip-flops, switches a flip-flop output signal at said flip-flop output thereof to a set state from a reset state in response to receiving said respective one of said delayed clock signals after a transition of said trigger signal;

a clock selection circuit having a first plurality of inputs receiving said delayed clock signals, each of a second plurality of inputs receiving a respective one of said flip-flop output signals, a plurality of feedback outputs, and a selected clock output;

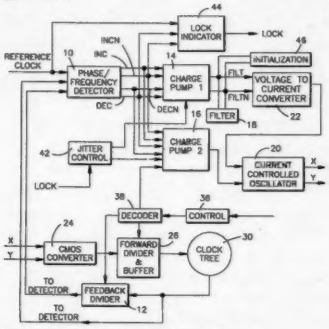
said clock selection circuit applying a selected one of said delayed clock signals to said selected clock output and a feedback signal to a selected feedback output of said feedback outputs in response to a first one of said flip-flop output signals switching to said set state; and

feedback means for connecting said feedback outputs to said third input of respective ones of said plurality of flip flops.

## 5,491,439
## METHOD AND APPARATUS FOR REDUCING JITTER IN A PHASE LOCKED LOOP CIRCUIT

**Ram Kelkar, South Burlington; Ilya I Novof, Essex Junction, and Stephen D. Wyatt, Jericho, all of Vt., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed Aug. 31, 1994, Ser. No. 298,695**
**Int. Cl.[6] H03L** *7/06*
**U.S. Cl. 327—157** **9 Claims**




1. A phase locked loop circuit comprising;

a phase/frequency detector for comparing the difference in the phase/frequency of an input clock reference signal with an output clock signal and for providing a phase/frequency output comprised of increment and decrement signals,

a charge pump coupled to said phase/frequency detector, for transferring said increment and decrement pulses to said charge pump,

a loop filter coupled to said charge pump, for providing a current input to a current controlled oscillator, the current controlled oscillator providing an output current having a frequency, the frequency relating to the magnitude of the current input to the current controlled oscillator, and

a jitter control circuit connected to said phase/frequency detector and to said charge pump;

said jitter control circuit including a first circuit element directly connecting said charge pump to a first current source;

a second circuit element connecting said charge pump to a second current source;

a switch having open and closed positions in said second circuit element for connecting and disconnecting said second circuit element and said charge pump to and from each other; and

an actuation circuit in circuit connection with said switch and for triggering operation of said switch in response to a predetermined phase relationship between said input clock reference signal and said output clock signal; said actuation circuit comprising:

a phase lock signal input for receiving a phase lock signal; and

a complementary follower circuit in circuit connection with said phase lock signal input and for isolating said phase lock signal input from said switch.

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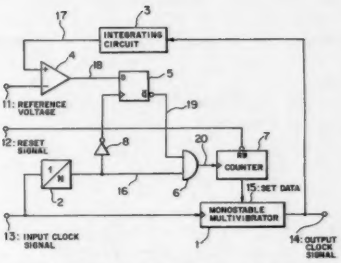
## 5,491,440
## AUTOMATIC CLOCK DUTY CYCLE ADJUSTING CIRCUIT

**Takafumi Uehara, and Masayoshi Dehara, both of Tokyo, Japan, assignors to Ando Electric Co., Ltd., Tokyo, Japan**

**Filed Feb. 23, 1995, Ser. No. 393,286**
**Claims priority, application Japan, Mar. 16, 1994, 6-071470**
**Int. Cl.[6] H03K** *5/08*
**U.S. Cl. 327—172** **1 Claim**

1. An automatic clock duty cycle adjusting circuit comprising:




a monostable multivibrator for receiving an input clock signal at its clock terminal and outputting an output clock signal;

a frequency dividing circuit for dividing down said input clock signal by 1/N;

an inverter for inverting an output of said frequency dividing circuit;

an integrating circuit for receiving said output clock signal;

a comparator for receiving an output of said integrating circuit and a reference voltage corresponding to a desired duty cycle;

a D-type flip-flop for receiving an output of said comparator at its data terminal and an output of said inverter at its clock terminal;

an AND gate for receiving an inverse output of said D-type flip-flop and said output of said frequency dividing circuit; and

a counter for receiving a reset signal at its reset terminal and an output of said AND gate at its clock terminal, and for counting a set data which is input to said monostable multivibrator, wherein said monostable multivibrator outputs said output clock signal having a pulse width corresponding to said set data.

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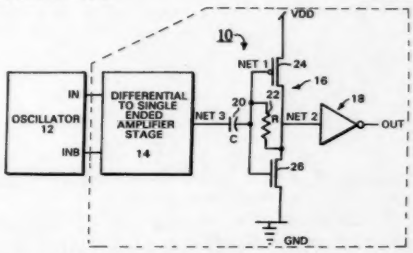
## 5,491,441
## METHOD AND APPARATUS FOR GENERATING A CLOCK SIGNAL FROM A CONTINUOUS OSCILLATOR SIGNAL INCLUDING A TRANSLATOR CIRCUIT

**Christian J. Goetschel; Robert A. Greene; Robert A. Kertis; Rick A. Philpott; Raymond A. Richetta, all of Rochester; Timothy J. Schmerbeck, Kasson; Donald J. Schulte, Rochester, and David P. Swart, Pine Island, all of Minn., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed Jun. 30, 1994, Ser. No. 269,197**
**Int. Cl.[6] H03K** *13/02*
**U.S. Cl. 327—291** **15 Claims**




1. Apparatus for generating a clock signal comprising:

first differential means having an input and an output for receiving differential oscillator outputs at said input and for generating at said output a differential amplified voltage output signal;

a first inverter having an input and an output;

a second inverter having an input and an output, said second inverter input coupled to said first inverter output;

AC coupling means for AC coupling said differential amplified voltage output signal to said first inverter input; and

feedback means for applying a feedback control signal from said first inverter output to said first inverter input, wherein said feedback means include a resistor connected between said first inverter output and said first inverter input, said resistor having a predetermined resistance value.

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**5,491,442**

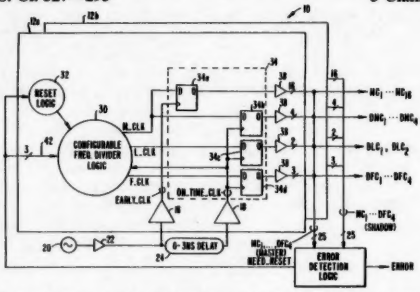
## MULTIPLE FREQUENCY OUTPUT CLOCK GENERATOR SYSTEM

**Russell N. Mirov, San Jose; Duc N. Le, Santa Clara; Frank Mikalauskas, San Jose; C. John Grebenkemper, Saratoga, and Kinying Kwan, San Jose, all of Calif., assignors to Tandem Computers Incorporated, Cupertino, Calif.**

**Division of Ser. No. 289,823, Oct. 3, 1994, which is a continuation of Ser. No. 87,556, Jul. 2, 1993, Pat. No. 5,371,417. This application May 17, 1995, Ser. No. 442,851**

**Int. Cl.**[6] **G06F** *1/04;* **H03K** *3/00*

**U.S. Cl. 327—295** **5 Claims**




**1**. A clock generator circuit for producing a plurality of clock signals, the clock generator comprising:

a source of a master clock signal;

a delay element coupled to receive the master clock signal to produce a delayed clock signal;

a frequency divider that receives the delayed clock signal to produce therefrom a divided clock signal;

a first flip-flop having a data input coupled to receive the divided clock signal, a clock input receiving the master clock signal, and an output; and

for each of a first predetermined number of the plurality of clock signals having a first frequency,

a second flip-flop having a data input receiving the output of the first flip-flop, a clock input receiving the delayed clock signal, and an output whereat a corresponding one of said first predetermined number of the plurality of clock signals is provided.

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**5,491,443**

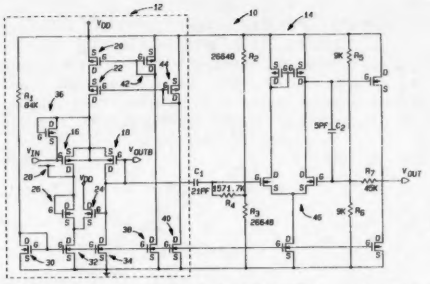
## VERY LOW-INPUT CAPACITANCE SELF-BIASED CMOS BUFFER AMPLIFIER

**Seyed R. Zarabadi, Kokomo, Ind., assignor to Delco Electronics Corporation, Kokomo, Ind.**

**Filed Jan. 21, 1994, Ser. No. 183,706**

**Int. Cl.**[6] **H03K** *17/687*

**U.S. Cl. 327—391** **35 Claims**




**23**. A buffer amplifier for buffering and amplifying a capacitive output of a sensor, said buffer amplifier comprising:

a first field effect transistor (FET) including a gate terminal, a source terminal and a drain terminal, said first FET acting as an input FET wherein an output signal from the sensor is applied to the gate terminal of the first FET as an input signal, said drain terminal of the first FET being connected to a shielding layer;

a second FET including a gate terminal, a source terminal and a drain terminal, wherein the source terminal of the second FET is connected to the source terminal of the first FET, and the gate terminal and the drain terminal of the second FET are connected such that the first and second FETs act as a unity gain amplifier so that a signal at the gate-terminal of the second FET substantially coincides with the input signal applied at the gate terminal of the first FET;

a tail cascoded current source, said tail cascoded current source including a third FET and a fourth FET each including a gate terminal, a source terminal and a drain terminal. wherein the source terminal of the third FET is connected to a voltage source, the drain terminal of the third FET is connected to the source terminal of the fourth FET and the drain terminal of the fourth FET is connected to the source terminals of the first and second FETs;

a fifth FET including a gate terminal, a source terminal and a drain terminal, wherein the gate terminal of the fifth FET is connected to the drain terminal of the second FET, and the drain terminal of the fifth FET is connected to the voltage source;

a sixth FET including a gate terminal, a source terminal and a drain terminal, wherein the source terminal of the sixth FET is connected to the source terminal of the fifth FET, and the gate and drain terminals of the sixth FET are connected to the drain terminal of the first FET;

a seventh FET including a gate terminal, a source terminal and a drain terminal, wherein the gate terminal of the seventh FET is connected to one of the group consisting of the gate terminal Of the first FET, the source terminal of the first FET and a voltage source;

an eighth FET including a gate terminal, a source terminal and a drain terminal, wherein the drain and gate terminals of the eighth FET are connected to the voltage source and the source terminal of the eighth FET is connected to a ground potential;

a ninth FET including a gate terminal, a source terminal and a drain terminal, wherein the gate terminal of the ninth FET is connected to the gate terminal of the eighth FET, the drain terminal of the ninth FET is connected to the source terminals of the fifth and sixth FETs, and the source terminal of the ninth FET is connected to a ground potential;

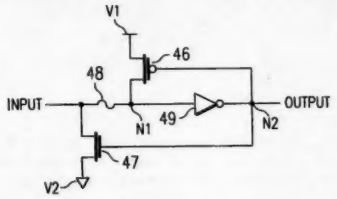
a tenth FET including a gate terminal, a source terminal and a drain terminal, wherein the gate terminal of the tenth FET is connected to the gate terminal of the ninth FET, the drain terminal of the tenth FET is connected to the drain terminal of the second FET, and the source terminal of the tenth FET is connected to a ground potential; and

an amplifier circuit, said amplifier circuit receiving the output signal from the gate terminal of the second FET and providing an amplified output signal.

## 5,491,444
## FUSE CIRCUIT WITH FEEDBACK DISCONNECT

David C. McClure, Carrollton, Tex., assignor to SGS-THOMSON Microelectronics, Inc., Carrollton, Tex.

Filed Dec. 28, 1993, Ser. No. 174,139
Int. Cl.[6] H01H *37/76*
U.S. Cl. 327—525 30 Claims




1. A circuit for defining a logic state in an integrated circuit, comprising:

a first logic element having an input and an output;

a fuse element having a first terminal and a second terminal wherein the first terminal is coupled to the input of said first logic element, said fuse element being selectively configured in a conducting or a non-conducting state between said first and second terminals;

a first transistor having a control electrode and having a conduction path coupled between a first voltage source and the input of said first logic element, said conduction path of said first transistor being enabled or disabled responsive to the output of said first logic element; and

a second transistor having a control electrode and having a conduction path coupled between the second terminal of said fuse element and a second voltage source such that said second voltage source is decoupled from said input of said first logic element if said fuse element is in said non-conductive state, said conduction path of said second transistor being enabled or disabled responsive to the output of said first logic element.

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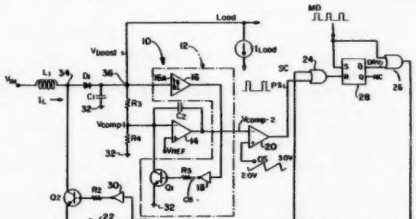
## 5,491,445
## BOOSTER POWER CONVERTER HAVING ACCELERATED TRANSIENT BOOST RESPONSE

David D. Moller, Kokomo, Ind., and James B. Archibald, Reading, Pa., assignors to Delco Electronics Corporation, Kokomo, Ind.

Filed Jul. 5, 1994, Ser. No. 270,539
Int. Cl.[6] G05F *1/40;1/10*
U.S. Cl. 327—540 3 Claims




1. A booster power converter having a circuit common, receiving an input voltage $V_{IN}$ and developing an output voltage $V_{boost}$ which is higher than said input voltage $V_{IN}$ said booster power converter comprising:

(a) an arrangement of an inductor, a diode having an anode and a cathode, a storage capacitor, and a voltage divider for dividing an applied voltage by a predetermined amount and having an input terminal, an intermediate terminal for making available a divided voltage and an output terminal, said inductor having a first end connected to said input voltage $V_{IN}$ and a second end connected to said anode of said diode and forming a first node therebetween, said cathode of said diode connected to a first end of said storage capacitor which has its second end connected to said circuit common, said first end of said storage capacitor connected to said input terminal of said voltage divider and forming a second node therebetween and on which said output voltage $V_{boost}$ is present, said voltage divider having its output terminal connected to said circuit common;

(b) an error amplifier having a first input terminal connected to said intermediate terminal of said voltage divider and having an input signal $V_{comp-1}$ thereon, and a second input terminal connected to a first reference voltage, said error amplifier developing an output voltage $V_{comp-2}$ proportional to a difference between said input signal $V_{comp-1}$ and said first reference voltage;

(c) an arrangement of a first comparator and a first transistor switch having an input electrode, a gate electrode, and an output electrode, said first transistor switch being arranged to have its input electrode connected to said intermediate terminal of said voltage divider, its gate electrode responsive to said first comparator and its output electrode connected to said circuit common, said first comparator comparing said output voltage $V_{boost}$ with an internal reference voltage that establishes a threshold band having lower and upper predetermined limits, said first comparator generating a control signal CS when $V_{boost}$ falls below said lower limit and subsequently terminating said control signal CS when $V_{boost}$ thereafter rises above said upper limit, said control signal CS being connected to said gate electrode of said first transistor switch and rendering said first transistor switch conductive;

(d) a second comparator having a first input terminal receiving said output voltage $V_{comp-2}$ and a second input terminal receiving a linearly rising and falling sawtooth wave signal OS, said second comparator developing a pulse signal PS when the OS signal exceeds the output signal $V_{comp-2}$; and

(e) an arrangement of a flip-flop and a second transistor switch having an input electrode, a gate electrode, and an output electrode, said second transistor switch being arranged to have its input electrode connected to said first node, its gate electrode responsive to said flip-flop and its output electrode connected to said circuit common, said flip-flop having set and reset input terminals, said reset input terminal receiving said pulse signal PS and said set input terminal receiving a timing signal MD representative of a predetermined duty cycle of said booster power converter, said flip-flop generating an output drive signal DRV indicative of the receipt of said pulse signal PS, said drive signal DRV being connected to said gate electrode of said second transistor switch and rendering said second transistor switch conductive.

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## 5,491,446
## ADAPATIVE CONTROL DEVICE

Tsuyoshi Okada, Yokosuka; Toshiaki Kobayashi, Shiki, and Hidetaka Ozawa, Urawa, all of, Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, and Honda Motor Co., Ltd., Tokyo, both of, Japan

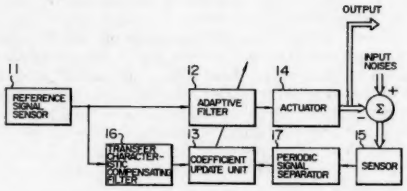
Filed Nov. 15, 1993, Ser. No. 152,013
Claims priority, application Japan, Nov. 19, 1992, 4-310443
Int. Cl.[6] H04B *15/00*
U.S. Cl. 327—551 8 Claims

1. An adaptive control device comprising:

means for separating input noises into a periodic signal and other signals;

an adaptive filter, receiving a reference signal an input, for canceling the periodic signal contained in said input noises and for generating a control signal at an output in accordance with said reference signal;

means receiving said input noises and said control signal, for deriving a differential input signal between said input noises




and said control signal and for outputting an output error corresponding to said differential input signal; and

means for correcting a coefficient of said adaptive filter in accordance with periodic error components picked up by said means for separating from said output error, said means for correcting being connected to receive said reference signal and being connected to said means for separating to receive a signal representing said periodic error components and to said adaptive filter to correct said coefficient.

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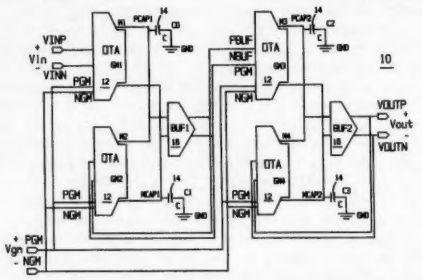
**5,491,447**

**OPERATIONAL TRANSCONDUCTANCE AMPLIFIER WITH INDEPENDENT TRANSCONDUCTANCE AND COMMON MODE FEEDBACK CONTROL**

**Christian J. Goetschel; Robert A. Greene; Robert A. Kertis; Rick A. Philpott; Raymond A. Richetta, all of Rochester; Timothy J. Schmerbeck, Kasson; Donald J. Schulte, Rochester, and David P. Swart, Pine Island, all of Minn., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed May 13, 1994, Ser. No. 242,219**
**Int. Cl.[6] H03F** *3/45*
**U.S. Cl. 330—254** **13 Claims**




**1**. An integrated biquadratic, continuous-time filter section using operational transconductance amplifiers (OTAs), the improvement comprising:

each OTA including four differential transistor pairs;

means for simultaneously changing a transconductance (GM) of each of the OTAs by adjusting a differential voltage applied to each of said four differential transistor pairs.

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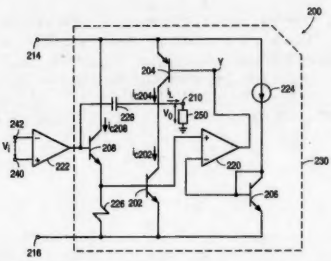
**5,491,448**

**CLASS AB OUTPUT STAGE WITH IMPROVED FREQUENCY STABILITY**

**Toyojiro Naokawa, Saitama, and Katsushige Fujii, Osaka, both of, Japan, assignors to National Semiconductor Corporation, Santa Clara, Calif.**

**Filed Jul. 29, 1994, Ser. No. 282,866**
**Int. Cl.[6] H03F** *3/30*
**U.S. Cl. 330—264** **22 Claims**

**15**. A method of biasing a class AB output stage having an output transistor and a complementary output transistor coupled in series and having a biasing transistor, comprising the steps of:




driving the complementary output transistor with a voltage that varies as a function of an input signal to the output stage;

supplying a reference voltage generated by the biasing transistor having a size scaled to a size of the complementary output transistor so that a selected AB biasing is achieved;

determining a difference voltage between the voltage driving the complementary output transistor and the reference voltage;

driving the output transistor with the difference voltage; and

applying a control current driving the output transistor so that a voltage applied to the control terminal of the complementary output transistor is equal to a base/emitter voltage of the biasing transistor.

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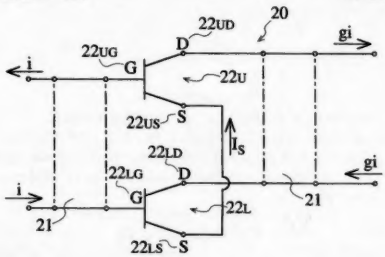
**5,491,449**

**DUAL-SIDED PUSH-PULL AMPLIFIER**

**Edwin F. Johnson, Sunnyvale; Douglas G. Lockie, Monte Sereno, and Clifford A. Mohwinkel, San Jose, all of Calif., assignors to Endgate Technology Corporation, Sunnyvale, Calif.**

**Filed Nov. 19, 1993, Ser. No. 155,030**
**Int. Cl.[6] H03F** *3/26;3/16*
**U.S. Cl. 330—269** **14 Claims**




**1**. An apparatus comprising:

a spacing means (**12**) defining a pair of parallel spaced-apart faces (**12***a* and **12***b*) for providing support;

an active device means (**14**) for processing a plurality of input signals (I); said active device means (**14**) being mechanically coupled to said spacing means (**12**);

a first pair of conductor means (**16***a* & **16***d*) for carrying said plurality of input signals (I); said plurality of input signals (I) moving in opposite directions but being substantially identical;

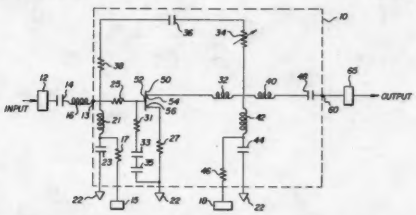
a second pair of conductor means (**16***c* & **16***d*) for carrying a plurality of output signals (gi); said plurality of output signals (gi) moving in opposite directions but being substantially identical; and

both of said first and said second pairs of conductor means (**16***a* & **16***b* and **16***c* and **16***d*) being maintained by said spacing means (**12**) in a generally symmetrical configuration relative to said active device means (**14**) with one of said conductor means in each of said first and said second pairs of conductor means being supported on one of said faces, and the other of said conductor means in each of said first and second pairs of conductor means being supported on the other of said faces.

## 5,491,450
## LOW POWER CONSUMPTION PROCESS-INSENSITIVE FEEDBACK AMPLIFIER

**David R. Helms, and Michael J. Fithian, both of Liverpool, N.Y., assignors to Martin Marietta Corporation, Syracuse, N.Y.**

**Filed Jun. 1, 1993, Ser. No. 69,869**
**Int. Cl.[6] H03F *1/34***
**U.S. Cl. 330—277** **14 Claims**




1. An amplifier comprising:

a high electron mobility transistor (HEMT), the HEMT having a first port, a second port and a third port, the second port for receiving an input signal for controlling electron flow between the first and third port, the third port for supplying an output signal in response to the input signal;

a shunt feedback circuit connected between the third port and the second port; and

a series feedback circuit connected between the first port and a predetermined reference potential,

wherein the shunt feedback circuit includes variable resistance and inductance, the variable resistance for obtaining a predetermined value of resistance, and further wherein the amplifier is implemented as a monolithic microwave integrated circuit (MMIC) and the inductance is a resonator in the form of a U.

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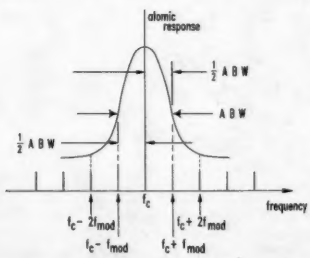
## 5,491,451
## METHOD AND APPARATUS FOR REDUCTION OF ATOMIC FREQUENCY STANDARD PHASE NOISE

**Thomas C. English, Costa Mesa, Calif., assignor to Ball Corporation, Muncie, Ind.**

**Filed Nov. 17, 1994, Ser. No. 341,372**
**Int. Cl.[6] H03L *7/26***
**U.S. Cl. 331—3** **17 Claims**




3. A method for providing an atomic frequency standard, the method comprising the steps of:

providing a physics package having an atomic transition frequency with an atomic bandwidth,

providing a frequency standard having an output signal,

converting the output signal to provide an interrogation signal,

generating an error signal based on a frequency difference between the interrogation signal and the atomic transition frequency of the physics package, and

using the error signal to reduce the frequency difference,

wherein the converting step includes the step of providing modulation of the interrogation signal such that the modulation frequency is at least on the order of half the atomic bandwidth.

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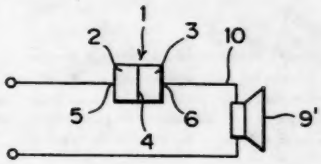
## 5,491,452
## PELTIER ELEMENT AS SERIES NOISE CLAMP

**Kazuo Ohtsubo, Tokyo, and Kinichi Uemura, Yokohama, both of, Japan, assignors to Melcor Japan Co., Ltd., Tokyo, and Kinichi Uemura, Kanagawa, both of, Japan**

**Continuation of Ser. No. 753,707, Sep. 3, 1991, abandoned.**
**This application Oct. 26, 1994, Ser. No. 329,688**
**Claims priority, application Japan, Sep. 18, 1990, 2-249662; Dec. 17, 1990, 2-417874; Mar. 4, 1991, 3-123202; Jul. 19, 1991, 3-203577**
**Int. Cl.[6] H01L *35/00***
**U.S. Cl. 327—552** **5 Claims**




1. A method of using a Peltier element to reduce electrical circuit noise in an electrical circuit which includes an electromagnetic device, comprising the steps of:

providing an electrical circuit to produce an alternating electric current through an electromagnetic device;

coupling a Peltier element into said electrical circuit, said Peltier element comprising:

(a) two components of different kinds of electroconductive materials,

(b) a junction between said components,

(c) two electrodes formed, respectively, by a part of said two components for coupling said element into said electrical circuit,

said materials having a thermoelectric power which exceeds 50 $\mu VK^{-1}$ as an absolute value at an activating temperature of said element, and wherein there is substantially no rectifying action at said junction.

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## 5,491,453
## NARROW-BAND FILTER HAVING A VARIABLE CENTER FREQUENCY

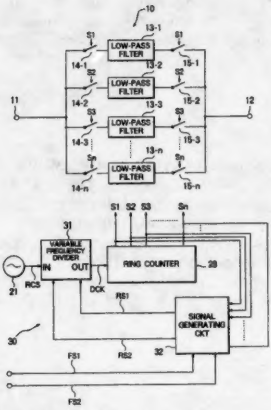
**Masaki Ichihara, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan**

**Filed Feb. 10, 1994, Ser. No. 194,316**
**Claims priority, application Japan, Feb. 10, 1993, 5-022211**
**Int. Cl.[6] H04B *1/10***
**U.S. Cl. 327—553** **7 Claims**

1. A narrow-band filter supplied through an input terminal with an input signal having a predetermined frequency for filtering said input signal to produce a filtered signal through an output terminal and comprising:

first through n-th low-pass filters having the same filter characteristic which are connected in parallel to one another, where n represents a positive integer greater than unity;

switching means connected to said first through said n-th low-pass filters for time divisionally connecting said first through said n-th low-pass filters between said input and said output terminals, said first through said n-th low-pass filters time divisionally filtering said input signal for first through n-th filtering durations, respectively, and producing first through n-th time division filtered signals, respectively, collectively as said filtered signal; and




control means connected to said switching means and supplied with a frequency designation signal designating said predetermined frequency for controlling said switching means to vary at least one of said first through said n-th filtering durations in accordance with said frequency designation signal, such that said narrow-band filter has center frequency which varies in accordance with said at least one of said first through said n-th filtering durations.

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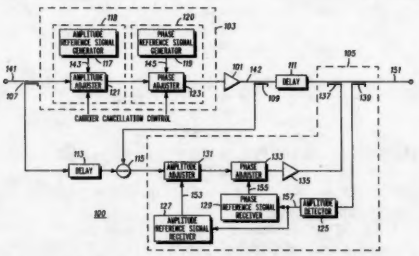
**5,491,454**

## METHOD AND APPARATUS FOR REDUCING DISTORTION IN AN OUTPUT SIGNAL OF AN AMPLIFIER

**John E. Matz, Hanover Park, Ill., assignor to Motorola, Inc., Schaumburg, Ill.**

**Filed Oct. 31, 1994, Ser. No. 332,163**
**Int. Cl.[6] H03F** *1/26*
**U.S. Cl. 330—149** **27 Claims**




**1**. A method for reducing distortion contained in an output signal of an amplifier circuit, the method comprising the steps of:

a) modulating an input signal of the amplifier circuit with a reference modulation to produce a modulated signal;

b) amplifying the modulated signal to produce an amplified modulated signal;

c) sampling the input signal to produce a sampled input signal;

d) sampling the amplified modulated signal to produce a sampled amplified modulated signal;

e) subtracting at least a portion of the sampled input signal from at least a portion of the sampled amplified modulated signal and using an envelope amplitude detector to determine the reference modulation contained in the amplified modulated signal to produce a determined modulation; and

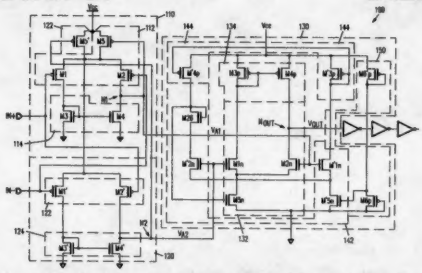
f) using the determined modulation to mitigate the distortion contained in the output signal of the amplifier circuit.

**5,491,455**

## DIFFERENTIAL-TO-SINGLE ENDED TRANSLATOR THAT GENERATES AN OUTPUT SIGNAL WITH VERY SMALL SIGNAL DISTORTION

**James R. Kuo, Cupertino, Calif., assignor to National Semiconductor Corporation, Santa Clara, Calif.**

**Filed Nov. 10, 1994, Ser. No. 337,259**
**Int. Cl.[6] H03F** *3/45*
**U.S. Cl. 330—253** **13 Claims**




**11**. A translator for converting a pair of input signals into a single-ended output signal, the translator comprising:

a first conversion amplifier that amplifies the difference between a first input signal and a second input signal, and outputs an output signal in response thereto;

a second conversion amplifier connected to the first conversion amplifier that amplifies the difference between the first input signal and the second input signal, and outputs an intermediate signal in response thereto, the intermediate signal controlling the rise and fall times of the output signal, the second conversion amplifier having a tail current; and

a voltage divider connected to the second conversion amplifier that outputs a constant voltage that controls the tail current.

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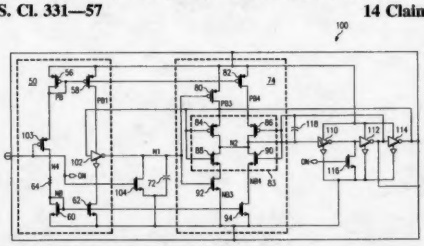
**5,491,456**

## OSCILLATOR COMPENSATED FOR IMPROVED FREQUENCY STABILITY

**Michael R. Kay, Richardson, and Frank L. Thiel, V, Austin, both of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.**

**Filed Dec. 8, 1994, Ser. No. 352,315**
**Int. Cl.[6] H03B** *5/24;5/04;* **H03L** *1/00;* **H03K** *3/011*
**U.S. Cl. 331—57** **14 Claims**



**1**. An oscillator circuit, comprising:

a current generator having at least two PMOS transistors and at least two NMOS transistors, each of said transistors having first, second and gate terminals, said PMOS transistors being connected to a supply voltage terminal through their respective first terminals, said NMOS transistors being connected to a ground terminal through a first of said terminals, the second terminal of a first of said NMOS transistors being connected through a source of resistance to the second terminal of a first of said PMOS transistors;

a switch assembly connected to the second terminal of a second of said PMOS transistors and to the second terminal of a second of said NMOS transistors;

a current storage device connected to said switch assembly; and

a hysteresis circuit connected to said current storage device and operable to generate a potential difference, said hysteresis circuit comprising at least one PMOS transistor and at least one NMOS transistor that are coupled to said current generator PMOS and NMOS transistors, respectively, so as to mirror current through said current generator PMOS and NMOS transistors.

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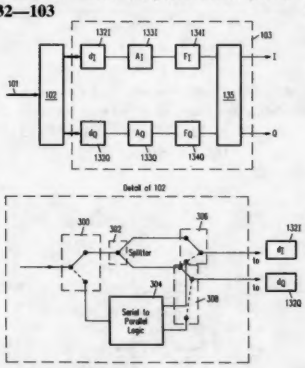
5,491,457

## F-MODULATION AMPLIFICATION

Kamilo Feher, 44685 Country Club Dr., El Macero, Calif. 95618

Filed Jan. 9, 1995, Ser. No. 370,117
Int. Cl.[6] H03C *3/00;* H04L *27/12;27/20*
U.S. Cl. 332—103 30 Claims




1. A structure comprising:
a input port for receiving input data;
a splitter having an input coupled to said input port, and serving to split said input data into baseband signal streams; and
a baseband signal processing network for receiving said baseband signal streams and providing cross-correlated processed in phase and quadrature phase baseband signals.

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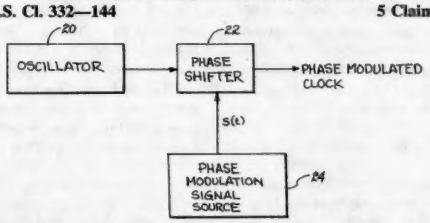
5,491,458

## APPARATUS FOR SPREADING THE SPECTRUM OF A SIGNAL AND METHOD THEREFOR

Earl W. McCune, Jr., 2383 Pruneridge Ave., Suite 3, Santa Clara, Calif. 95050, and Narendar Venugopal, 837 Cape Trinity Pl., San Jose, Calif. 95133

Filed Nov. 8, 1994, Ser. No. 336,006
Int. Cl.[6] H03C *3/00;* H03B *29/00;* H03K *3/84*
U.S. Cl. 332—144 5 Claims



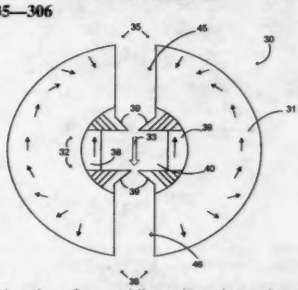

1. Apparatus for causing a clock signal of a digital system to have a power density spectrum, comprising:
an oscillator;
a source of a periodic phase modulation signal;
means for phase modulating the output of said oscillator in response to said phase modulation signal, said phase modulation signal causing said means to provide a phase modulated signal with a power density spectrum within a known bandwidth, said power density spectrum being substantially flat.

5,491,459

## MAGIC SPHERE PROVIDING DISTORTION-FREE ACCESS TO A LARGE INTERNAL WORKING SPACE CONTAINING A UNIFORM HIGH-INTENSITY MAGNETIC FIELD

Herbert A. Leupold, Eatontown, N.J., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Jun. 23, 1995, Ser. No. 494,614
Int. Cl.[6] H01F *7/02*
U.S. Cl. 335—306 9 Claims




1. A magic sphere for providing a large internal working space containing a uniform magnetic field, comprising:
a spherical permanent magnet shell for generating the uniform magnetic field, said shell forming an internal cavity, said shell having a predetermined thickness, an inner and an outer surface, a pair of magnetic poles forming a polar axis along which the uniform magnet field is directed, and an equatorial axis transverse to said polar axis;
a permanent magnet insert for enhancing the magnitude of the internal field, said permanent magnet insert positioned in said internal cavity adjacent to said inner surface of said shell along the circumference of said equatorial axis of said shell, said permanent magnet insert magnetized in a direction opposite to said polar axis; and
a pair of passive ferromagnet caps for smoothing out any non-uniformity in the internal field, said passive caps positioned in said internal cavity at opposite ends of said polar axis adjacent to said magnetic poles of said shell such that said permanent magnet insert is positioned therebetween, said permanent magnet insert and said passive caps forming the large internal working space within said internal cavity.

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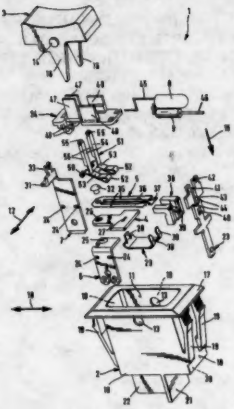
5,491,460

## INSTRUMENT SWITCH HAVING INTEGRATED OVERCURRENT PROTECTION

Fritz Krasser, Altdorf, and Wolfgang Schmidt, Berg, both of, Germany, assignors to Ellenberger & Poensgen GmbH, Altdorf, Germany

Filed Mar. 17, 1994, Ser. No. 213,810
Claims priority, application Germany, Mar. 17, 1993, 9303919 U
Int. Cl.[6] H01H *71/16;61/00;71/18;3/00*
U.S. Cl. 337—70 28 Claims

1. A manually-operated, electrical instrument switch comprising:
an insulating housing having an interior;
a contact bridge within the interior that is movable between a closed contact position and an opened contact position;
a rocker switch pivotally seated in said insulating housing and including a working end that dips into the housing interior for moving said contact bridge between the closed contact position and opened contact position; and
a contact spring being electrically connected in series with said contact bridge, and including a rocker-snap mechanism movable in first and second directions for moving said contact spring between a respective contact position and an open position, and a thermal triggering element for overcurrent protection, said rocker-snap mechanism being fixed to be



permanently mechanically prestressed in the second direction, whereby the contact spring is fixed in its contact position counter to the mechanical prestress and is transferred into its open position by said thermal triggering element during overcurrent, and is guided back into its contact position from its open position by pivoting said rocker switch causing said rocker-snap mechanism to move in the first direction counter to the mechanical prestress.

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**5,491,461**

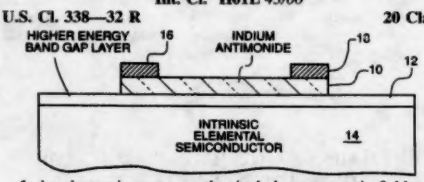
**MAGNETIC FIELD SENSOR ON ELEMENTAL SEMICONDUCTOR SUBSTRATE WITH ELECTRIC FIELD REDUCTION MEANS**

**Dale L. Partin, Ray; Joseph P. Heremans, Troy, and Louis Green, Rochester Hills, all of Mich., assignors to General Motors Corporation, Detroit, Mich.**

**Filed May 9, 1994, Ser. No. 239,772**

**Int. Cl.[6] H01L** *43/00*

**U.S. Cl. 338—32 R** **20 Claims**




1. An electronic apparatus that includes a magnetic field sensor of indium antimonide for applications having thermal cycling with wide temperature variation, said apparatus comprising:

a monocrystalline substrate of at least one substantially intrinsic elemental semiconductor selected from the class consisting of silicon and germanium, said semiconductor having a given energy band gap and said substrate having a substantially planar monocrystalline surface portion;

an epitaxial active layer about 1 to 5 μm thick of a compound semiconductor selected from the group consisting of indium antimonide and indium arsenide on the substrate surface portion, said compound semiconductor epitaxial layer being configured as an elongated mesa on said substrate surface portion and having an electron mobility of greater than about 15,000 $cm^2/V\bullet s$;

said layer being doped n-type such that it contains an excess density of electrons in said compound semiconductor epitaxial layer, said excess density relatively stabilizing majority carrier density from about –40° C. to about 200° C. without degrading said electron mobility to less than about 15,000 $cm^2/V\bullet s$;

at least two electrical conductors respectively contacting spaced portions of said elongated compound semiconductor epitaxial mesa layer for applying a voltage difference between said spaced portions, which voltage difference would form an associated electric field in said elemental semiconductor substrate; and

field reduction means for limiting the maximum associated electrical field formed in said elemental semiconductor by said voltage difference to a value that does not exceed the dielectric strength of the elemental semiconductor,

effective to provide a compound semiconductor magnetic field sensor on a lower cost substrate in said apparatus, which compound semiconductor magnetic field sensor substantially retains its original electron mobility after extensive thermal cycling, and thereby substantially retains its original magnetic sensitivity after such cycling.

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**5,491,462**

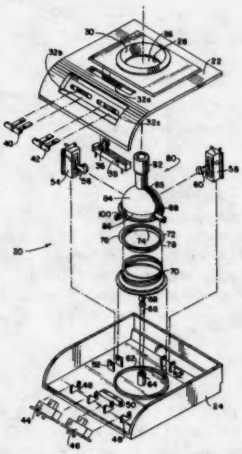
**JOYSTICK CONTROLLER**

**Marino Cecchi, Hawthorn Woods, and Guerrino Suffi, Addison, both of Ill., assignors to Wico Corporation, Niles, Ill.**

**Filed Feb. 22, 1994, Ser. No. 199,823**

**Int. Cl.[6] H01C** *10/16*

**U.S. Cl. 338—128** **19 Claims**



1. A joystick controller, comprising a housing; a joystick supported by said housing for pivotal movement in any direction to any tilt angle; a first variable impedance device supported by said housing and having a first control means that is linearly movable to vary the impedance of said first variable impedance device; a second variable impedance device supported by said housing and having a second control means that is linearly movably to vary the impedance of said second variable impedance device; and means for mechanically coupling said first and second control means to said joystick for directly linearly moving said first and second control means in response to pivotal movement of said joystick to vary the impedances of said first and second variable impedance devices by respective amounts in accordance with the direction and amount of pivotal movement of said joystick, wherein said joystick comprises a control shaft having a lower end and a hemispherical-shaped member toward said control shaft lower end, said hemispherical-shaped member having a spherical surface, and said housing having at top wall, a circular opening in said too wall, a bearing surface around the circumference of said top wall opening, and a bottom wall, and including fulcrum means on said housing bottom wall, said joystick being supported by said housing with said control shaft extending through said housing top wall opening to the exterior of said housing, with said spherical surface of said hemispherical-shaped member slidingly engaging said bearing surface around said opening for movement therein, and with a bottom

end of said control shaft resting on said fulcrum means for pivotal movement of said joystick about said fulcrum means.

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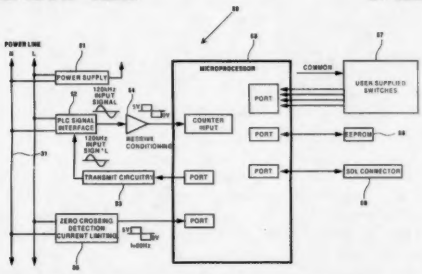
**5,491,463**

## POWER LINE COMMUNICATION SYSTEM

**Matthew G. Sargeant, and Michael A. Neal, both of Indianapolis, Ind., assignors to Advanced Control Technologies, Inc., Indianapolis, Ind.**

**Filed Jun. 28, 1993, Ser. No. 84,711**
**Int. Cl.[6] H04B** *3/00*
**U.S. Cl. 340—310.01** **27 Claims**




**1**. In a power line communication system comprising at least one transmitter electrically connected to a power line for the transmission of a data signal, the power line transmitting an AC power line signal of known frequency and having zero crossings, the data signal comprising data bits transmitted over the power line at a frequency greater than the frequency of the power line signal with the data signal's data bits transmitted at the zero crossing of the power line signal, at least one addressable receiver having a receiver address associated therewith, the receiver electrically connected to the power line and capable or receiving the data signal generated by the transmitter, the data signal being generally in accordance with a known protocol, the known protocol comprising an X-10 protocol including in sequence a start code comprising a bit pattern of 1110, a four bit first receiver address code, and an extended code command comprising a bit pattern of 01111, the improvement comprising:

the data signal further comprising a second receiver address/command code of at least five bits in number and the number of bits thereof being indivisible by four, immediately following the extended code command of the bit pattern **01111**, at least one bit of said second address/command code representing whether the second address/command code represents a portion of the receiver address or a command, such that by combining the second receiver address/command code with the first receiver address code when the second receiver address/command code represents a portion of the receiver address at least 257 receivers with unique addresses may be controlled by data signals transmitted on the power line.

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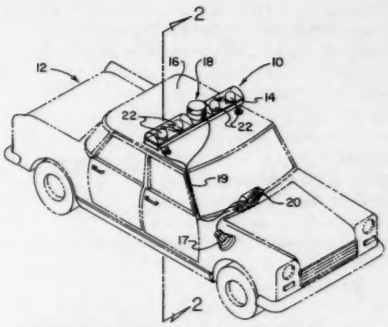
**5,491,464**

## REMOTELY CONTROLLED RADAR GUN AND VIDEO RECORDING APPARATUS

**Conrad C. Carter, and Sharon G. Carter, both of 51 Parkhaven Dr., Vallejo, Calif. 94591**

**Filed Mar. 14, 1994, Ser. No. 209,271**
**Int. Cl.[6] B60Q** *1/00*
**U.S. Cl. 340—425.5** **13 Claims**




**11**. A new and improved remotely-controlled video recording apparatus for a motor vehicle which has a roof, a siren, lights capable of flashing, a siren actuator in the motor vehicle interior and a flashing light actuator in the motor vehicle interior, comprising:

a roof-mounted support assembly mounted on the roof of the motor vehicle,

a first remote-controlled video camera assembly mounted on said roof-mounted support assembly,

a video camera actuator assembly, connected to said first remote-controlled video camera assembly at a location remote from said first remote-controlled video camera assembly and connected to the siren actuator and to the flashing light actuator, wherein said first remote-controlled video camera assemble is automatically activated by said video camera actuator assembly when either the siren actuator or the flashing light actuator is actuated by a police officer, wherein said first remote-controlled video camera assembly is positioned on said roof-mounted support assembly so that said first remote-controlled video camera assembly records activity in front of the motor vehicle,

an interior remote-controlled video camera assembly mounted on an interior surface of the roof of the motor vehicle, and

a pressure-actuated video camera actuator assembly located in a back seat of the motor vehicle, wherein said pressure-actuated video camera actuator assembly is connected to said interior remote-controlled video camera assembly, wherein said interior remote-controlled video camera assembly is automatically activated by said pressure-actuated video camera actuator assembly when a person sits on the back seat.

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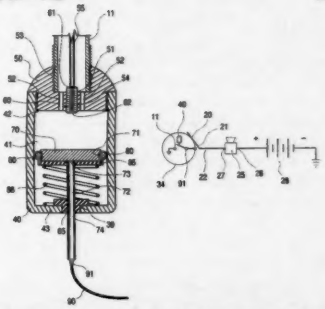
**5,491,465**

## TIRE AIR PRESSURE SYSTEM

**Robert H. Adams, P.O. Box 102, Dupont, Ind. 47231**

**Filed Nov. 14, 1994, Ser. No. 337,755**
**Int. Cl.[6] B60C** *23/00*
**U.S. Cl. 340—442** **11 Claims**



**1**. An improved inflatable tire air pressure monitoring system of the type having

a valve stem having a valve core plunger, said valve stem attached to said tire;

a hub;

a wheel having a valve stem hole, said tire mounted on said wheel so that said valve stem is disposed through said valve stem hole, and said wheel mounted on said hub;

an electrical contact brush;

means for attaching said brush proximate to said hub;

an annunciator having a first terminal and a second terminal;

an external direct current voltage source;

means for electrically connecting said first terminal to the positive terminal said voltage source;

means for electrically connecting said wheel to the negative terminal said voltage source; and

means for electrically connecting said second terminal to said brush;

wherein the improvement comprises:

an electrically insulating annular disk having a planar first surface and a wire lead hole, said disk demountably and concentrically interposed between said wheel and said hub so that said first surface is proximate to said hub, and said wire lead hole disposed through said disk;

a electrically conductive flattened ring attached to said first surface concentric with said disk, proximate to said wire lead hole, and disposed in sliding contact with said brush;

an electrically conducting sensor housing having a cylindrical cavity, a stepped-bore aperture, a bushing hole, and a plurality of air passages, said aperture having a threaded valve stem bore and a threaded adjustment screw bore, said aperture disposed through said sensor housing so that said aperture is coaxial with said cylindrical cavity, said adjustment screw bore is adjacent to said cylindrical cavity, said bushing hole disposed through said sensor housing, coaxial with and adjacent to said cylindrical cavity opposing said adjustment screw bore, said valve stem bore threadably engaged with said valve stem, said air passages disposed through said sensor housing and proximate to said valve stem bore so that air may flow from said valve stem into said cylindrical cavity;

an electrically conducting adjustment screw having a screw first end and a screw second end, said adjustment screw disposed in said adjustment screw bore, the length of said adjustment screw chosen so that said screw first end projects into said valve stem bore, contacts and depresses said valve core plunger and said screw second end projects into said cylindrical cavity;

an electrically insulating bushing disposed within said bushing hole so that the axis of said bushing is coaxial with the axis of said cylindrical cavity;

an electrically conducting piston head having a circumferential slot, said piston head disposed coaxially with respect to and within said cylindrical cavity, the diameter of said piston head chosen to be slightly less than the diameter of said cylindrical cavity;

an electrically conducting piston shaft having a piston shaft first end and a piston shaft second end, said piston shaft first end attached to said piston head so that said piston shaft is normal to and coaxial with said piston head and said piston shaft second end is slidably disposed through said bushing;

an electrically insulating, flexible, resilient O-ring, disposed surrounding said piston head in said circumferential slot, the thickness of said O-ring chosen so that said O-ring forms an airtight seal with respect to said cylindrical cavity while permitting sliding coaxial movement of said piston head with respect to said cylindrical cavity;

means for biasing said piston head away from said bushing so that said piston head is electrically insulated from said sensor housing;

means for electrically connecting said piston shaft second end to said ring; and

means for electrically connecting said sensor housing to said wheel.

**5,491,466**

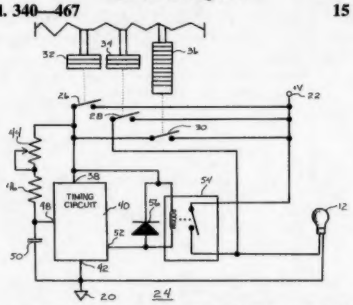
## CLUTCH AND THROTTLE RESPONSIVE BRAKE LIGHT CONTROL APPARATUS AND METHOD

**Richard P. Maiocco, Sr., Phoenix, Ariz., assignor to Charles J. Davis, and Walter R. Andrews, both of Phoenix, Ariz.**

**Filed Jun. 1, 1993, Ser. No. 69,440**

**Int. Cl.[6] B60Q** *1/44*

**U.S. Cl. 340—467** **15 Claims**




**9**. In a motor vehicle having a brake light, a clutch, and a throttle, a method of operating said brake light in connection with the operation of said vehicle to enhance safety, said method comprising the steps of:

determining when said throttle is substantially in an idle state;

determining when said clutch is substantially engaged;

delaying a predetermined duration after said throttle enters said idle state;

delaying substantially said predetermined duration after said clutch is engaged; and

energizing said brake light at full power after said predetermined duration has transpired.

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**5,491,467**

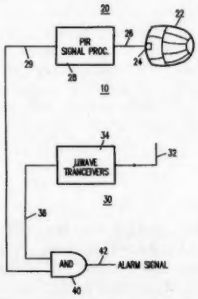
## LOCATION INDEPENDENT INTRUSION DETECTION SYSTEM

**Lawrence R. Tracy, Auburn; Frederick W. Eggers, Dixon; David Houston, Sacramento; Walter B. Wallace, Granite Bay, and Jeffrey Bamford, El Dorado Hills, all of Calif., assignors to C & K Systems, Inc., Folsom, Calif.**

**Filed Jan. 31, 1994, Ser. No. 189,419**

**Int. Cl.[6] G08B** *13/19;13/24*

**U.S. Cl. 340—522** **4 Claims**




**1**. A location-independent intrusion detection system, comprising:

passive infrared radiation (PIR) intrusion detection means for sensing the infrared radiation of an intruder, said PIR detection means comprising a substantially hemispherically shaped fresnel lens having a plurality of fresnel lens segments, each lens segment for focusing infrared radiation from a field of view, with the plurality of fresnel lens segments focusing infrared radiation from a plurality of spaced apart fields of view from a substantially conically shaped volume of space,

with the conically shaped volume of space having an axis perpendicular to the plane of the PIR intrusion detection means, and the volume of space symmetrical about the axis; and

microwave transceiver means comprising microwave generating means for generating microwave radiation, a bent monopole antenna for radiating the microwave radiation generated by the microwave generating means into a substantially balloon shaped symmetrical volume of space having an axis, substantially perpendicular to the plane of the microwave transceiver means;

wherein the balloon shaped volume of space of said microwave transceiver means substantially coincides with the conically shaped volume of space of the PIR intrusion detection means.

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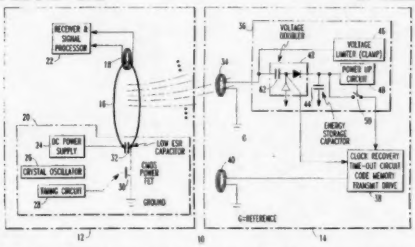
## 5,491,468
## IDENTIFICATION SYSTEM AND METHOD WITH PASSIVE TAG

**David F. Everett, Gambrills; John W. Frech, Baltimore; Theodore Wright, Crownsville, and Kelly M. Rodriquez, Columbia, all of Md., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.**

**Filed Jun. 24, 1993, Ser. No. 80,843**
**Int. Cl.[6] G08B** *21/00*
**U.S. Cl. 340—572** **17 Claims**




**16**. A passive portable tag for an identification system having a reading device for supplying a continuous wave alternating magnetic field to the tag and for receiving information from the tag, when magnetically coupled to the tag, the tag comprising

a receiving coil for receiving the continuous wave alternating magnetic field from the reading device,

a storage capacitor electrically connected to the receiving coil to be charged throughout a first time period to a predetermined voltage,

a first circuit means responsive to the charged capacitor attaining a predetermined voltage level, to discharge the capacitor, and

a second circuit means responsive to the discharging of the capacitor for transmitting the information during a second time period shorter than the first time period, the first circuit means being operable in direct response to the voltage across the capacitor having attained the predetermined voltage level and independent of the amplitude of the received continuous wave magnetic field.

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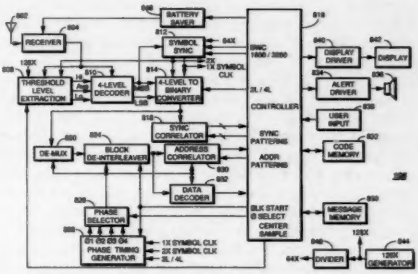
## 5,491,469
## COMMUNICATION SYSTEM FOR TEMPORARILY DIRECTING RADIO RECEIVERS TO A SECOND RADIO FREQUENCY

**Robert J. Schwendeman, Pompano Beach, Fla., assignor to Motorola, Inc., Schaumburg, Ill.**

**Continuation of Ser. No. 891,311, May 29, 1992, abandoned.**
**This application Jun. 10, 1994, Ser. No. 258,137**
**Int. Cl.[6] H04Q** *7/00*
**U.S. Cl. 340—825.04** **15 Claims**

**1**. A radio communication system for communicating on at least two radio frequencies, the radio communication system, comprising:




receiving means for receiving information addressed to at least one of a plurality of radio receivers;

a first transmitting means for transmitting the information including a control signal therewith to at least one of the plurality of radio receivers on a first radio frequency;

a second transmitting means for transmitting information on a second radio frequency;

a paging terminal, coupled the receiving means, and the first and second transmitting means, determines when to transmit information on the second radio frequency by selecting the second transmitting means;

means for generating the control signal to be transmitted on the first radio frequency in response to the paging terminal selecting the second transmitting means for transmitting information to the at least one of the plurality of radio receivers; said at least one of the plurality of radio receivers, comprising:

receiving means for receiving information and the control signal on the first radio frequency;

decoder means for decoding the received information and the second radio frequency from the control signal .being received on the first radio frequency;

means for programming said receiving means to receive information on the second radio frequency in response to the control signal being received on the first radio frequency;

controller means, coupled to said means for programming, for controlling when to reprogram said receiving means to return from the second radio frequency to the first radio frequency within a predetermined time to continue receiving information on the first radio frequency.

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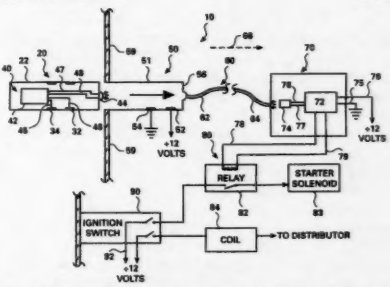
## 5,491,470
## VEHICLE SECURITY APPARATUS AND METHOD

**James T. Veligdan, Manorville, N.Y., assignor to Associated Universities, Inc., Washington, D.C.**

**Filed Apr. 18, 1994, Ser. No. 228,715**
**Int. Cl.[6] G06F** *7/04;* **B60R** *25/04;* **H03K** *17/94*
**U.S. Cl. 340—825.310** **2 Claims**




**1**. A vehicle security apparatus for use in a motor vehicle, comprising:

an optical key having a transmitter having at least one first preprogrammed coded signal stored in a first electric circuit;

a receptacle for receiving said optical key and at least one transmittable coded optical signal from said transmitter corresponding to said at least one first preprogrammed coded signal stored in said first electric circuit;

a receiver for comparing said at least one transmittable coded optical signal to at least one second preprogrammed coded signal stored in a second electric circuit and said receiver being adapted to trigger switching effects for at least one of enabling starting the motor vehicle and starting the motor vehicle upon determination that said at least one transmittable coded optical signal corresponds to said at least one second preprogrammed signal in said second electric circuit;

at least one optical fiber operatively connected between said receptacle and said receiver for carrying said optical signal from said receptacle to said receiver;

operatively connected means for starting the motor;

said transmitter having a light emitting diode for producing said optical signal, said receiver having a photo diode for detecting said optical signal, and said optical key having a means for rotatably initiating a sequential generation of said transmittable coded optical signals in said receptacle for starting the motor vehicle.

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**5,491,471**

## ACCESS CONTROL SYSTEM WHERE THE CARD CONTROLS THE TRANSMISSION FORMAT OF THE CARD READER

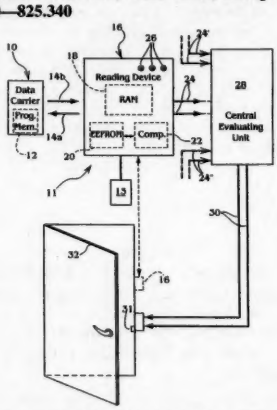
**Anatoli Stobbe, Steinradweg 3, D-3013 Barsinghausen 2, Germany**

**Filed Oct. 22, 1992, Ser. No. 964,776**

**Claims priority, application Germany, Jan. 23, 1991, 41 34 922.9**

**Int. Cl.[6] G06F** *7/06;* **G05B** *23/00;* **H04Q** *3/02*

**U.S. Cl. 340—825.340** **15 Claims**




1. An access control system for controlling access of individuals to an area comprising:

at least one programmed data carrier, each programmed data carrier being assigned to an individual and having a programmable memory including

i. bits in a predetermined format defining authorization data, said predetermined format and said authorization data being specific to the individual and the area; and

ii. control data identifying said predetermined format;

a stationary reading device installed adjacent to the area for receiving control data and authorization data from said data carrier, said stationary reading device having uninitialized and unprogrammed programmable reader memory, said reader memory being programmable to identify one of a variety of different formats;

locking means installed adjacent to the area for controlling acess to the area; and

central evaluating means including check data, said central evaluating means coupled to said stationary reading device and said locking means;

said reading device reading said data carrier with said control data programming said reader memory to read and transmit only the bits in the predetermined format, so that said reading device relays said authorization data unaltered to said central evaluating means,

whereby if said authorization data matches said check data, said central evaluation means instructs said locking means to allow access to the area.

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**5,491,472**

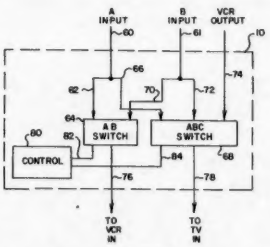
## RF SWITCHING WITH REMOTE CONTROLLERS DEDICATED TO OTHER DEVICES

**Fred R. Kurtz, 9901 W. Sahara Ave., Apt. 1115, Las Vegas, Nev. 89117**

**Filed Dec. 28, 1993, Ser. No. 174,224**

**Int. Cl.[6] G08C** *19/00;* **H04N** *5/268*

**U.S. Cl. 340—825.57** **11 Claims**




1. Apparatus for selectively switching first and second signal sources along switching paths extensible to the input of a video recorder having an RF output and to the input of a television receiver, comprising:

a switching circuit having:

a first switch input connectable with said first signal source electrically coupled with a first switch responsive to a first control condition to provide an electrically closed condition along a switch path extending for connection with said input of said video recorder, and further electrically coupled with a second switch responsive to a second control condition to provide an electrically closed condition along a switch path extending for connection with said input of said television receiver,

a second switch input connectable with said second signal source, electrically coupled with a third switch, responsive to a third control condition to provide an electrically closed condition along a switch path extending for connection with said input of said video recorder, further electrically coupled with a fourth switch responsive to a fourth control condition to provide an electrically closed condition along a switch path extending for connection with said input of said television receiver,

a third switch input connectable with said RF output, electrically coupled with a fifth switch responsive to a fifth control condition to provide an electrically closed condition along a switch path extending for connection with said input of said television receiver; and

a switch control responsive to actuating inputs for selectively providing said first, second, third, fourth, and fifth control conditions, said switch control deriving said fifth control condition to effect said fifth switch electrically closed condition and said second and third control conditions to effect an electrically open condition of said second and third switches when said first switch is in a said electrically closed condition, and said fourth switch is in an electrically open condition.

## 5,491,473
## SYSTEM FOR REMOTE DATA COLLECTING, METHOD IMPLEMENTED IN THIS SYSTEM AND DATA COLLECTOR DEVICE

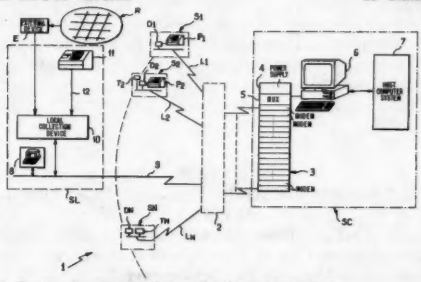
**Jérôme Gilbert, Levallois Perret, France, assignor to Euro CP S.A.R.L., L'Hay les Roses, and IMS France, Montrouge, both of, France**

**Filed Oct. 5, 1993, Ser. No. 131,697**

**Claims priority, application European Pat. Off., Mar. 31, 1993, 93400829**

**Int. Cl.[6] G08B** *23/00*

**U.S. Cl. 340—870.01** **23 Claims**



**1**. System for remote data collection comprising:

a plurality of local collection sites, each site comprising at least one means for collecting data, said data collecting means comprising a microcontroller;

data acquisition devices connected to said data collection means and comprising said microcontroller, said data collection means collecting and storing data from said data acquisition devices;

a first local communication network for each local collection site, said first local communication network connecting said data acquisition devices to the data collecting means of said local collection sites;

a central site comprising central monitoring and processing means and at least one means for receiving and transmitting data, said data receiving and transmitting means being connected to said central monitoring and to said processing means,

a second communication network connecting said local collection sites and said central site;

said data receiving and transmitting means receiving data transferred from said plurality of local collection sites via said second communication network and transmitting said received data to said central monitoring and processing means for processing;

said data collecting means having means for simultaneously sending a collective data capture command to said data acquisition devices, to thereby cause said data acquisition devices to acquire data at a same time instant, said data acquisition devices further comprising means for transmitting said acquired data in an asynchronous manner to said data collecting means.

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## 5,491,474
## TELEMETRIC TRANSMITTER UNIT

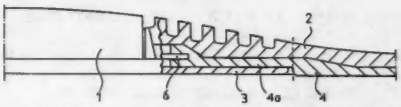
**Jouko Suni, Kausala, and Tapio Tammi, Oulu, both of, Finland, assignors to Polar Electro Oy, Finland**

**Continuation of Ser. No. 885,607, May 19, 1992, abandoned. This application Nov. 16, 1994, Ser. No. 341,999**

**Claims priority, application Finland, May 22, 1991, 912487**

**Int. Cl.[6] G08C** *17/04*

**U.S. Cl. 340—870.31** **9 Claims**



**1**. A telemetric transmitter unit comprising:

(a) one or more electrodes for placement on the skin of a living being and detecting signals from the living being;

(b) a transmitter for receiving signals from the one or more electrodes and generating a magnetic field in response to the received signals so as to wirelessly transmit the signals by using a magnetic proximity field, said transmitter including transmitter electronics;

(c) an electrically conductive plastic layer fixedly coupling the one or more electrodes to the transmitter electronics; and

(d) one or more plastic members joining the transmitter electronics, the electrodes and the conductive plastic layer together so as to form an integrated, waterproof transmitter unit, wherein the one or more plastic members comprises a plastic casing containing the transmitter electronics, and first and second plastic layers disposed one on the other and closing one side of the casing, one of the plastic layers being provided with one or more openings therein for holding the one or more electrodes so as to permit contact with the skin of a user during use of the unit.

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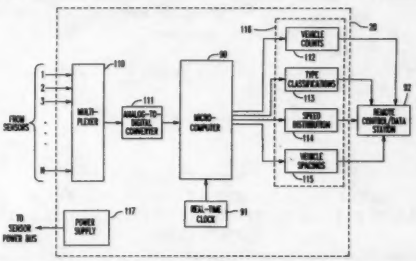
## 5,491,475
## MAGNETOMETER VEHICLE DETECTOR

**Gordon F. Rouse, Arden Hills, and William M. Volna, Minneapolis, both of Minn., assignors to Honeywell Inc., Minneapolis, Minn.**

**Filed Mar. 19, 1993, Ser. No. 34,440**

**Int. Cl.[6] G08G** *1/01*

**U.S. Cl. 340—933** **7 Claims**




**1**. A magnetometer vehicle detector, for a roadway having at least one lane, comprising: at least one magnetometer sensor in each lane; and wherein said magnetometer sensor comprises:

a magnetoresistor bridge, having a sensitive axis, outputting an electrical signal caused by a change of resistance in the magnetoresistor bridge due to a change of an ambient electromagnetic field, the change caused by a presence of a vehicle;

an amplifier connected to said magnetoresistor bridge for outputting an amplified electrical signal indicating the presence or absence of a vehicle;

an integrator connected to said amplifier for outputting an integrated electrical signal indicating the change of the ambient electromagnetic field and the presence or absence of a vehicle;

a feedback coil connected to said integrator and proximate to said magnetoresistor bridge for providing a magnetic feedback to said magnetoresistor bridge;

a reset coil proximate to said magnetoresistor bridge for switching a magnetization axis of said bridge between zero and 180 degrees alternately with respect to the sensitive axis; and

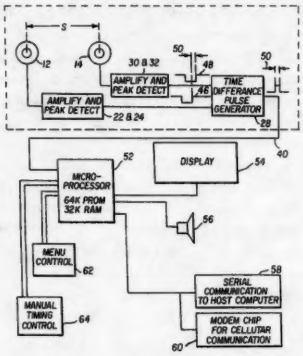
a signal line connected to said integrator for conveying the signal indicating the presence or absence of a vehicle.

**5,491,476**

## MAGNETICALLY TRIGGERED ELAPSED TIME INDICATOR

**James A. DiBella, 80 Lowden Point Rd., Rochester, N.Y. 14612**

**Filed Oct. 1, 1993, Ser. No. 130,490**
**Int. Cl.[6] G08G** *1/01;* **G08B** *23/00*
**U.S. Cl. 340—933** **14 Claims**




1. Apparatus providing input to a measuring device when a moving water craft passes a magnetic marker, said apparatus comprising:

first and second transducers spaced apart on the water craft for producing first and second electrical outputs, respectively, in response to movement of the transducers in a magnetic field;

means coupled to said transducers and using a time span between said outputs for discriminating between a) outputs consistent with movement of the water craft past the marker and b) outputs inconsistent with movement of the water craft past the marker, said discriminating means rejecting simultaneous outputs caused by movement of the water craft in earth's magnetic field; and

means providing said input only in response to said consistent outputs not rejected.

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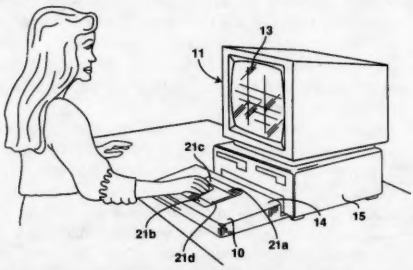
**5,491,477**

## ANTI-ROTATION MECHANISM FOR DIRECT MANIPULATION POSITION INPUT CONTROLLER FOR COMPUTER

**Michael R. Clark, Glendale; Alan C. Kay, Los Angeles, and Thomas Ferrara, Canyon Country, all of Calif., assignors to Apple Computer, Inc., Cupertino, Calif.**

**Filed Sep. 13, 1993, Ser. No. 120,678**
**Int. Cl.[6] G09G** *1/00;* **G08C** *21/00*
**U.S. Cl. 341—20** **18 Claims**




1. An apparatus for controlling the positioning of a pointer on a computer screen comprising:

a housing,

a finger-gripable element mounted in the housing for moving generally in two directions within the housing,

said housing comprising an area edge means for limiting movement of the finger gripable element, means for detecting movement of said finger gripable element and translating said movement into a signal interpretable by a computer for making a similar movement of a pointer on a computer screen,

means for connecting said finger gripable element to said means for detecting movement, said connecting means comprising a pantagraph means having a first connecting means and a second connecting means, said pantagraph means connected by said first connecting means to said finger gripable element and connected by said second connecting means to said housing,

whereby movement of said finger gripable element causes similar movement of said computer screen pointer without permitting any rotation of the finger gripable element relative to the computer screen pointer.

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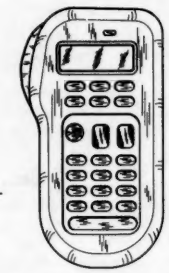
**5,491,478**

## SEAL MEMBRANE WITH INTEGRAL MICROPHONE SUPPORT

**Juan B. de la Luz, Miami; John C. Dzung, Plantation; Orlando Hernandez, and Jeff R. Beasley, both of Sunrise, all of Fla., assignors to Motorola, Inc., Schaumburg, Ill.**

**Filed May 31, 1994, Ser. No. 250,874**
**Int. Cl.[6] H01H** *9/00*
**U.S. Cl. 341—22** **14 Claims**




1. A unitarily molded seal having an integral microphone support for supporting a microphone, comprising:

a diaphragm integrally formed within the seal; and

a cavity wall integrally formed about said diaphragm, the cavity wall and diaphragm defining a cavity area for receiving said microphone.

6. An unitarily molded elastomeric keypad, comprising:

a main body;

a plurality of integrally formed keys located about said main body; and

a microphone support section integral to the main body for receiving a microphone, the microphone support section including:

a diaphragm; and

a cavity wall located about said diaphragm, the cavity wall defining a cavity area for receiving said microphone.

11. Am assembly, comprising:

a housing member having an aperture;

a microphone cartridge;

a unitarily molded seal located against the housing member, the seal including:

a diaphragm integrally formed within the seal and located substantially in front of the housing member aperture; and

a cavity wall integrally formed within the seal and located about said diaphragm, the cavity wall defining a cavity area for receiving said microphone cartridge, the diaphragm located between the microphone cartridge and the housing member aperture.

## 5,491,479
## 8B-16B RLL DECODER WITH HAMMING DISTANCE DETECTION

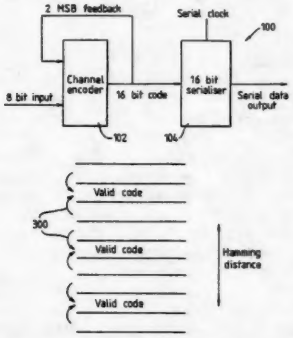
**James H. Wilkinson, Tadley, United Kingdom, assignor to Sony Corporation, Tokyo, Japan, and Sony United Kingdom Ltd., Middlesex, England**

**Filed Sep. 2, 1993, Ser. No. 114,826**

**Claims priority, application United Kingdom, Sep. 17, 1992, 9219716; Nov. 3, 1992, 9223017**

**Int. Cl.[6] H03M** *7/00*

**U.S. Cl. 341—58** **13 Claims**




1. Apparatus for decoding an input digital signal comprising successive n-bit groups of data bits by replacing said successive n-bit groups with respective ones from an ensemble of m-bit data words, each said m-bit data word having at least one associated valid n-bit code word, where n is greater than m, said apparatus comprising:

means for determining a Hamming distance between a current n-bit group of said input digital signal and each of said valid n-bit code words;

means for detecting whether one or more of said valid n-bit code words each have the lowest Hamming distance from said current n-bit group;

means, responsive to a detection that only one of said valid n-bit code words has the lowest Hamming distance from said current n-bit group, for replacing said current n-bit group with an m-bit data word from said ensemble of m-bit data words for which said Hamming distance between a valid n-bit code word associated with said m-bit data word and said current n-bit group is the lowest; and

means, responsive to a detection that more than one of said valid n-bit code words have said lowest Hamming distance from said current n-bit group, for replacing said current n-bit group with an m-bit data word associated with one of said more than one valid n-bit code words having said lowest Hamming distance from said current n-bit group when said lowest Hamming distance is equal to one and for replacing said current n-bit group with an m-bit data word for which a bit separation between a valid n-bit code word associated with said m-bit data word and said current group is the lowest when said lowest Hamming distance is not equal to one.

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## 5,491,480
## VARIABLE LENGTH DECODER USING SERIAL AND PARALLEL PROCESSING

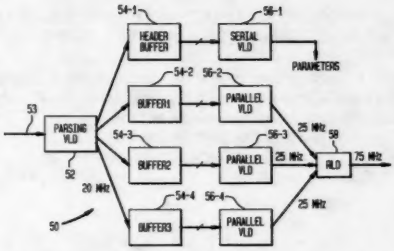
**Yung-Jung Jan, Taipei Hsien, and Yi-Feng Jang, Keelung, both of, Taiwan, Prov. of China, assignors to Industrial Technology Research Institute, Hsinchu, Taiwan, Prov. of China**

**Filed May 25, 1994, Ser. No. 249,119**

**Int. Cl.[6] H08M** *7/40*

**U.S. Cl. 341—67** **10 Claims**

1. A decoder architecture comprising




a bit-serial variable length decoder for receiving a variable length coded bit stream and for parsing said bit stream into individual variable length code words,

buffer means for buffering the individual variable length code words, and

a plurality of variable length decoders for decoding a plurality of said variable length code words in parallel to generate fixed length code words.

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## 5,491,481
## COMPRESSED DIGITAL DATA RECORDING AND REPRODUCING APPARATUS WITH SELECTIVE BLOCK DELETION

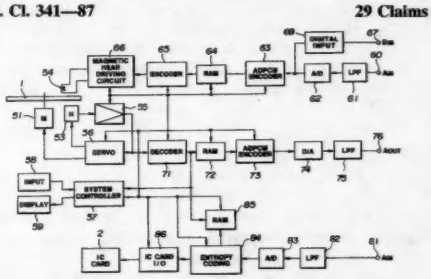
**Kenzo Akagiri, Kanagawa, Japan, assignor to Sony Corporation, Tokyo, Japan**

**Filed Nov. 17, 1993, Ser. No. 153,035**

**Claims priority, application Japan, Nov. 26, 1992, 4-317215**

**Int. Cl.[6] H03M** *7/30*

**U.S. Cl. 341—87** **29 Claims**




1. A compressed data recording and/or reproducing apparatus comprising:

a compressed data reproducing system for at least reproducing digital data from one recording medium in which digital data is bit-compressed and recorded;

a compressed data recording system for at least recording digital data in another recording medium in which digital data is bit-compressed and recorded;

the compressed data recorded in said one recording medium of the reproducing system being reproduced and transmitted to the recording system, the compressed data being bit-compressed at the same or a lower bit rate and recorded in said another recording medium;

wherein the compressed data reproduced by the reproducing system is directly transmitted or further compressed, without being expanded, so as to be transmitted to the recording system, and is recorded in the recording medium;

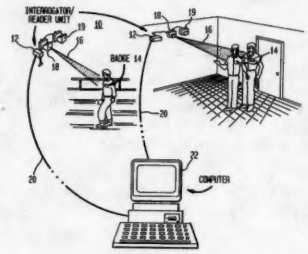
wherein the compressed data is recorded with the processing block of the bit compression being selectively deleted by means of a parameter of the bit compression.

5,491,482

## ELECTRONIC SYSTEM AND METHOD FOR REMOTE IDENTIFICATION OF CODED ARTICLES AND THE LIKE

**Andrew G. F. Dingwall, Princeton, and Jonathan L. Schepps, Princeton Junction, both of N.J., assignors to David Sarnoff Research Center, Inc., Princeton, N.J.**

**Filed Dec. 29, 1992, Ser. No. 998,164**
**Int. Cl.[6] G01S *13/74***
**U.S. Cl. 342—42** **59 Claims**




1. Apparatus for interrogating/identifying coded articles comprising:

an interrogator/reader (I/R) unit for transmitting at a suitable frequency to the articles a stream of binary bits of instruction and data words and for receiving responses from each article; and

a plurality of coded articles, each of the articles having electronic circuitry for storing as digital bits an identifying code number, the circuitry having means for detecting and demodulating the incoming bit stream from the I/R unit, and for generating clock and timing signals slaved to the bit stream for framing the incoming digital words, the circuitry having logic means for responding internally to the instruction and data words of the bit stream and for responding externally to the I/R unit at selected times such that the code number of an article is uniquely identified and that article alone among many communicates solely with the I/R unit when so identified.

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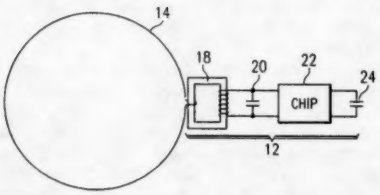
5,491,483

## SINGLE LOOP TRANSPONDER SYSTEM AND METHOD

**Loek J. D'Hont, Almelo, Netherlands, assignor to Texas Instruments Incorporated, Dallas, Tex.**

**Filed Jan. 5, 1994, Ser. No. 177,510**
**Int. Cl.[6] G01S *13/00***
**U.S. Cl. 342—42** **25 Claims**




1. An apparatus comprising:

an object formed of a non-conductive material;

a loop antenna disposed adjacent said object;

an impedance transformer matched to said loop antenna to a desired inductance; and

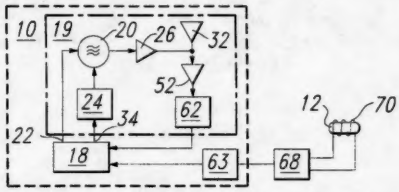
a transponder disposed near to and associated with said object, said transponder coupled to said antenna through said impedance transformer.

5,491,484

## ELECTRONIC TRANSPONDER TUNING CIRCUITRY

**Josef H. Schuermann, Oberhummel, Germany, assignor to Texas Instruments Incorporated, Dallas, Tex.**

**Continuation of Ser. No. 991,044, Dec. 15, 1992, Pat. No. 5,396,251. This application Dec. 22, 1994, Ser. No. 362,368**
**Int. Cl.[6] G01S *13/80***
**U.S. Cl. 342—51** **17 Claims**




1. An interrogator that transmits at least one RF interrogation pulse followed by at least one RF programming sequence containing tuning data to a responder, which is operable to transmit an RF response upon receipt of said at least one RF interrogation pulse, said interrogator comprising:

a) a detection circuit for detecting the strength of a carrier wave generated by said responder, and

b) a control circuit for analyzing the detected strength of said carrier wave and for determining if a new set of tuning data for another RF programming sequence needs to be computed.

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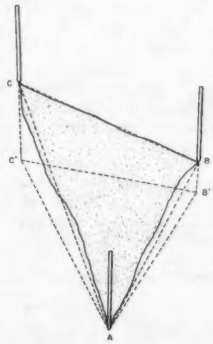
5,491,485

## SURVEYING SYSTEM USING RADIO RANGING AND BAROMETRIC HEIGHT

**Walter Vuch, Loc. S. Barbara 73/B, and Mario Mattera, Calle de Bernardis 16, both of 34015 Muggia (TS), Italy**

**PCT No. PCT/IT92/00133, § 371 Date May 6, 1994, § 102(e) Date May 6, 1994, PCT Pub. No. WO93/09399, PCT Pub. Date May 13, 1993**
**PCT Filed Oct. 30, 1992, Ser. No. 232,265**
**Claims priority, application Italy, Nov. 7, 1991, TS91A0011**
**Int. Cl.[6] G01C *15/00;5/06***
**U.S. Cl. 342—191** **3 Claims**




1. A surveying system using radio waves and barometric sensors for surveying by means of the trilateration method the system comprising: at least two portable stationary units (**9**) and one portable mobile unit (**1**) characterized both by employing radio ranging electromagnetic waves as vectors and by that the abovementioned units are built as rods made of a tube (**12**) of watertight and insulating material with a lower pointed end (**13**) and a spheric level (**2**) on the upper end; accumulators (**6**), transceiver instruments (**4**), an aerial (**15**) and a barometric sensor (**3**) are housed inside the tube (**12**); the tube (**12**) of the portable mobile units (**1**) contains also electronic components (**5**) for processing of surveyed

data, while a portable control keyboard (**8**) is connected to the tube (**12**) of the portable mobile units through a cable plugged in a multiple cable socket (**7**); each of the portable stationary units (**9**) houses inside the tube (**12**) the electronic components (**10**) which: include at least one microprocessor (**20**) or (**23**) with its interfaces; such microprocessor is connected to a signal amplifier (**21**) and, through the signal amplifier, to the barometric sensor (**3**), it is moreover connected to a memory (**22**) or (**24**); the electronic components (**10**) are also connected to the transceiver instruments (**4**) which comprise a modulated electromagnetic waves transmitter (**17**) and of a receiver (**18**) both connected to the aerial (**15**) through an electronic aerial change-over switch (**16**); the portable mobile unit (**1**) houses inside the tube (**12**) the electronic components (**5**), which: include at least one microprocessor (**25**) with its interfaces which is connected to a signal amplifier (**21**) and, through it, to the barometric sensor (**3**); such microprocessor is moreover connected to both a memory (**28**) and to an electronic circuit (**19**) for the telemetering of distances; the above-mentioned electronic components (**5**) are connected also to the transceiver instruments (**4**) both the latter elements are connected to the aerial (**15**) through an electronic aerial change-over switch (**16**); the electronic components (**5**) are also connected both to an electronic portable control unit (**8**) which includes a keyboard (**14**) and an alphanumeric display (**26**) and to a possible peripheral (**27**) for the registration of data.

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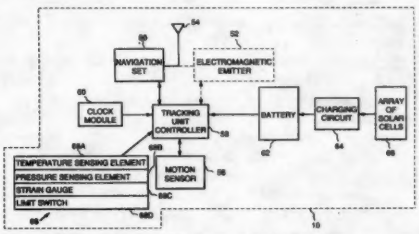
**5,491,486**

## MOBILE TRACKING UNITS EMPLOYING MOTION SENSORS FOR REDUCING POWER CONSUMPTION THEREIN

**Kenneth B. Welles, II, Scotia; Jerome J. Tiemann, Schenectady, and Harold W. Tomlinson, Jr., Scotia, all of N.Y., assignors to General Electric Company, Schenectady, N.Y.**

**Filed Apr. 25, 1994, Ser. No. 233,091**
**Int. Cl.[6] G01S *3/02***
**U.S. Cl. 342—357** **28 Claims**




**1**. A mobile tracking unit for a vehicle location system, said tracking unit comprising:

a navigation set for generating data substantially indicative of a respective vehicle position, said navigation set being adapted to be periodically energized at a selected activation rate $F_G$ while the vehicle is moving to generate vehicle position data;

a motion sensor for generating data indicative of vehicle motion; and

a tracking unit controller coupled to said motion sensor to receive the vehicle motion data, said tracking unit controller being adapted to control said navigation set based upon the vehicle motion data so that when the vehicle is substantially stationary the activation rate $F_G$ can be respectively decreased by a predetermined factor, thereby reducing overall power consumption of said tracking unit, said tracking unit controller being further adapted to revert to activation rate $F_G$ when said motion sensor indicates renewed vehicle motion, thereby avoiding any substantial loss of vehicle position data during renewed vehicle motion.

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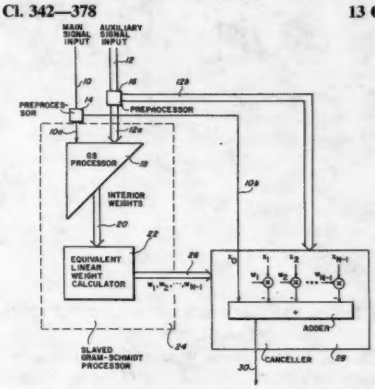
**5,491,487**

## SLAVED GRAM SCHMIDT ADAPTIVE NOISE CANCELLATION METHOD AND APPARATUS

**Karl R. Gerlach, Dunkirk, Md., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed May 30, 1991, Ser. No. 707,480**
**Int. Cl.[6] G01S *3/32***
**U.S. Cl. 342—378** **13 Claims**




**1**. A method for converting a filtering a plurality of input signals in a sensor system into one filtered output signal, said method comprising the steps of:

obtaining a first main input signal, and a plurality of first auxiliary input signals,

determining interior weights corresponding to said first main and auxiliary input signals,

determining equivalent linear weights corresponding to said interior weights,

obtaining a second main input signal and a plurality of second auxiliary input signals, said second main and auxiliary signals being obtained in substantially the same noise environment as said first main and auxiliary signals, and

adding said second main signal to the product of said equivalent linear weights and said second auxiliary input signals to thereby produce one filtered output signal corresponding to said second main and auxiliary signals, and

wherein said first main and auxiliary input signals are a subset of said second main and auxiliary input signals, respectively.

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**5,491,488**

## ELECTROMAGNETIC PROPAGATION TOOL USING MAGNETIC DIPOLE ANTENNAS

**Jian-Qun Wu, Houston, Tex., assignor to Baker Hughes Incorporated, Houston, Tex.**

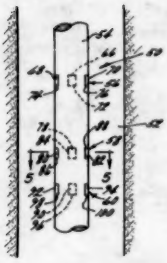
**Continuation-in-part of Ser. No. 897,372, Jun. 11, 1992, Pat. No. 5,331,331. This application May 12, 1994, Ser. No. 241,659**
**Int. Cl.[6] H01Q *1/04***
**U.S. Cl. 343—719** **41 Claims**

**1**. An electromagnetic propagation tool, comprising:

a drill collar segment;

a transmitter comprising at least one transmitting magnetic dipole antenna for propagating an electromagnetic wave, said transmitting magnetic dipole antenna comprising a small current loop dipole antenna noncircumferentially disposed on said drill collar segment; and

at least one receiver comprising at least one receiving magnetic dipole antenna for receiving the electromagnetic wave propagated by said transmitter, said receiving magnetic dipole antenna comprising a small current loop dipole antenna noncircumferentially disposed on said drill collar segment at an axial distance from said transmitter.

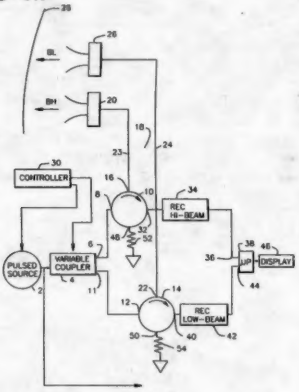


5,491,489

## ASR SYSTEM FOR MICROBURST DETECTION

Robert E. Johnson, Canoga Park; Gregory G. Charlton, Reseda; William G. Sterns, West Hills, and Ching-Fai Cho, Tujunga, all of Calif., assignors to ITT Corporation, New York, N.Y.

Filed Aug. 6, 1991, Ser. No. 740,990
Int. Cl.[6] H01Q *13/00*
U.S. Cl. 343—779 21 Claims




1. Apparatus for use in detecting aircraft and for detecting the pattern of low level wind velocity including:

first means for providing a first antenna beam for directing electromagnetic waves along a given direction;

second means for providing a second antenna beam for directing a beam of electromagnetic waves at an angle with respect to said given direction, said second antenna beam having less gain than said first antenna beam;

a source of pulsed electromagnetic waves;

means for coupling electromagnetic waves from said source to said antenna beams; and

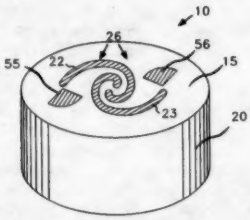
means for controlling said means for coupling electromagnetic waves from said source to said first and second antenna beams in such manner that more energy is coupled to said second antenna beam than to said first antenna beam when the apparatus is in an aircraft detection mode and that more energy is coupled to said first antenna beam than to said second antenna beam when the apparatus is in a wind pattern detection mode.

5,491,490

## PHOTON-TRIGGERED RF RADIATOR HAVING DISCRETE ENERGY STORAGE AND ENERGY RADIATION SECTIONS

Anderson H. Kim, Toms River; Robert J. Youmans, Brick, both of N.J.; Stephen E. Saddow, Columbia; Louis J. Jasper, Jr., Fulton, both of Md., and Maurice Weiner, Ocean, N.J., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Continuation-in-part of Ser. No. 121,656, Sep. 14, 1993, abandoned. This application Nov. 23, 1994, Ser. No. 344,801
Int. Cl.[6] H01Q *1/36*
U.S. Cl. 343—895 2 Claims




1. An ultra-wideband RF radiator, comprising:

a photoconductive dielectric substrate having an upper and a lower surface;

a charging electrode for storing a predetermined amount of electrical energy, said charging electrode positioned on said upper surface of said photoconductive substrate;

a ground plane electrode positioned on said lower surface of said photoconductive dielectric substrate, said ground plane electrode covering said lower surface of said substrate only in areas directly beneath said charging electrode to enable said charging electrode to store said predetermined amount of electrical energy; and

a radiating electrode for radiating a pulse of nanosecond pulsewidth dimension, said radiating electrode positioned on said upper surface of said photoconductive dielectric substrate, said radiating electrode and said charging electrode separated by a predetermined gap distance to prevent surface flashover between said charging electrode and said radiating electrode, and to enable said predetermined amount of electrical energy stored on said charging electrode to efficiently discharge through said radiating electrode upon an application of a predetermined type of light energy such that said pulse of nanosecond pulsewidth dimension radiates from said radiating electrode.

said charging electrode is comprised of a plurality of charging pads, said charging pads positioned in an outer annular region of said upper surface of said photoconductive substrate,

said radiating electrode is comprised of a spiral antenna having equiangular spiral arms, said spiral antenna positioned in a center region of said upper surface of said photoconductive substrate.

5,491,491

## PORTABLE ELECTRONIC EQUIPMENT WITH BINOCULAR VIRTUAL DISPLAY

Michael S. Lebby, Apache Junction, and Karen E. Jachimowicz, Laveen, both of Ariz., assignors to Motorola, Schaumburg, Ill.

Filed Oct. 31, 1994, Ser. No. 332,170
Int. Cl.[6] G09G *3/22*
U.S. Cl. 345—7 31 Claims

1. A portable electronic device with binocular virtual display comprising:

a portable data source; and

a miniature binocular virtual image display including

a pair of viewing apertures positioned for binocular viewing.

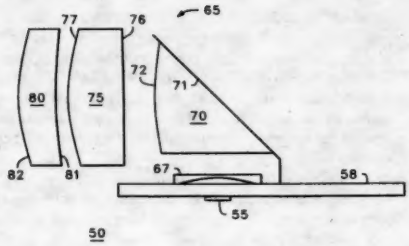



image generation apparatus operably attached to the portable data source for receiving data therefrom,

the image generation apparatus including a two-dimensional array of LEDs, greater than 100 LEDs by 100 LEDs, for providing, from the received data, a real image including one of a plurality of lines of alpha-numerics and graphics, the real image having a luminance of less than approximately 15 fL, and

a fixed optical system for producing, from the real image, a pair of virtual images one each perceivable through the pair of viewing apertures.

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**5,491,492**

**METHOD AND APPARATUS FOR EYE TRACKING FOR CONVERGENCE AND STRABISMUS MEASUREMENT**

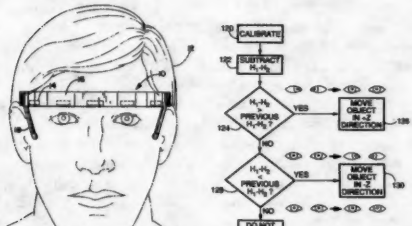
**R. Benjamin Knapp; Lisa E. Hake, both of Sebastopol, and Hugh S. Lusted, Sausalito, all of Calif., assignors to Biocontrol Systems, Inc., Palo Alto, Calif.**

**Division of Ser. No. 831,561, Feb. 5, 1992, Pat. No. 5,293,187. This application Jan. 12, 1994, Ser. No. 182,295**

**The portion of the term of this patent subsequent to Mar. 8, 2011, has been disclaimed.**

**Int. Cl.[6] A61B *3/14***

**U.S. Cl. 345—8** **6 Claims**




1. A method for controlling the position of an image on a video display, comprising the steps of:

(a) sensing electro-oculogram voltage signals representing the horizontal position of a right eye in relation to a first reference point;

(b) sensing electro-oculogram voltage signals representing the horizontal position of a left eye in relation to said first reference point;

(c) determining the numerical difference between said electro-oculogram voltage signals representing the horizontal position of said right eye and said electro-oculogram signals representing the horizontal position of said left eye;

(d) successively repeating step (c);

(e) controlling the position of an image on a video display based on a change in the amplitude of the electro-oculogram signals derived in step (d).

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**5,491,493**

**Patent Not Issued For This Number**

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**5,491,494**

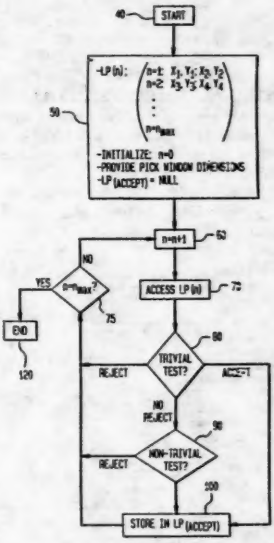
**PICK CORRELATION**

**Kevin B. Cornett, Wappingers Falls, and Edward F. Mark, Poughkeepsie, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed Nov. 19, 1993, Ser. No. 155,962**

**Int. Cl.[6] G09G *5/00***

**U.S. Cl. 345—118** **7 Claims**




1. In a computer graphics system, a method of selecting an object from a plurality of objects displayed on a computer graphics display in response to a user initiated pick selection, each of said plurality of objects comprising at least one line primitive having end-point coordinates, said method comprising the steps of:

(a) displaying a pick marker in a first position on said computer graphics display of said computer graphics system, said pick marker having a rectangular shaped pick window corresponding thereto;

(b) providing an input device for controlling movement of said pick marker within said computer graphics display;

(c) manipulating said input device for repositioning said pick marker to a second position within said computer graphics display, such that said pick marker is directed at a selected one of said plurality of objects displayed on said computer graphics display;

(d) inputting with said input device a signal effectuating selection of said selected object, wherein the selection is determined according to the steps of:

subjecting each line primitive of each object displayed on said computer graphics display to a trivial test, whereby said trivial test is capable of testing line primitives having both end-points outside of the same extended edge of said rectangular shaped pick window, and accepting or rejecting line primitives in accordance with the results of said trivial test;

subjecting line primitives which are incapable of being tested by said trivial test to a non-trivial test, said non-trivial test comprising the steps of transforming the coordinates of said rectangular shaped pick window such that its center is at the origin coordinates and transforming the coordinates of the line primitive in accordance with and relative to the transformed coordinates of said rectangular shaped pick window, comparing a threshold value based on end-point coordinates of the line primitive with a product-sum based on the height and width of said rectangular shaped pick window and end-point coordinates of the line primitive, and accepting the line primitive if the threshold value is less than or equal to the product-sum; and

(e) subjecting the object corresponding to line primitives accepted during said trivial or non-trivial test to further computer processing.

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**5,491,495**

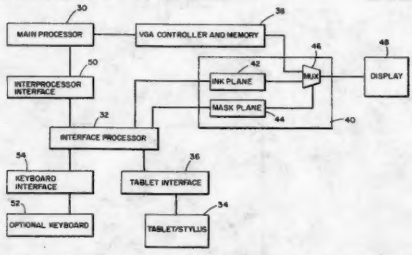
**USER INTERFACE HAVING SIMULATED DEVICES**

**Jean R. Ward, Arlington; David M. Barrett, Tyngsboro; Patricia A. Martin, Groton, and Christopher D. Mokoski, Auburn, all of Mass., assignors to Wang Laboratories, Inc., Lowell, Mass.**

**Filed Nov. 13, 1990, Ser. No. 613,416**

**Int. Cl.[6] G09G** *3/02*

**U.S. Cl. 345—173** **18 Claims**




1. A system for receiving input from a non-mouse pointing device, movements of which are controlled by a user of the system, and for providing the received input to a program having a means for receiving input from a mouse, the system comprising:

(A) user input means for use with a display screen, said user input means including a stylus and a digitizing tablet for generating absolute coordinate data in response to said stylus interacting with said digitizing tablet;

(B) means for displaying on the display screen a mouse icon, at least a portion of which represents a simulated mouse surface,

(C) means by which the user can visually correlate pointing device locations with locations on the display screen,

(D) means coupled to said user input means for converting to relative coordinate data only those stylus movements that begin within the simulated surface portion of the mouse icon,

(E) means for providing the relative coordinate data to the program's means for receiving input from a mouse; wherein

(F) the displayed mouse icon further includes a button portion, and wherein the system further includes means for converting a touch action of the stylus in the button portion of the mouse icon to mouse button data and for providing the mouse button data to the program's means for receiving mouse data; and wherein

there is a further portion of the displayed mouse icon, and wherein stylus movements beginning in the further portion control a scaling of a conversion from absolute coordinate data to relative coordinate data.

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**5,491,496**

**DISPLAY CONTROL DEVICE FOR USE WITH FLAT-PANEL DISPLAY AND COLOR CRT DISPLAY**

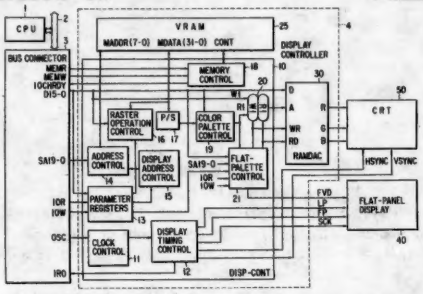
**Yuichi Tomiyasu, Tokyo, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan**

**Continuation of Ser. No. 921,749, Jul. 30, 1992, abandoned. This application May 2, 1994, Ser. No. 237,711**

**Claims priority, application Japan, Jul. 31, 1991, 3-191436; Jun. 8, 1992, 4-147698**

**Int. Cl.[6] G09G** *3/02*

**U.S. Cl. 345—147** **7 Claims**




1. A display control device for controlling a color CRT display and a monochrome flat-panel display with $2^m$ gradations, comprising:

color table means having a plurality of color registers for holding color data for one pixel of said color CRT display, one of said color registers being selected by display data having color information;

supply means for converting R, G, B color data held by the selected register of the color table means into analog color video signals and for supplying the converted video signals to said color CRT display;

summing-colors-to-gray-scale means for converting the intensity value found for each of the color data R, G, and B written into the selected color registers of the color table means into its corresponding gray scale value of n bits (n>m);

forming means for adding a predetermined value to first gradation data represented by the high-order m bits of the n-bit gray scale value (n>m) converted by the summing-colors-to-gray-scale means so as to form a set of second gradation data of m bits;

selecting means connected to each of said set of forming means and said flat panel display for selecting one of said first gradation data and said set of second gradation data in accordance with a select signal for each of a plurality of dots constituting one pixel of a flat panel display device and for supplying the selected data to said flat panel display; and

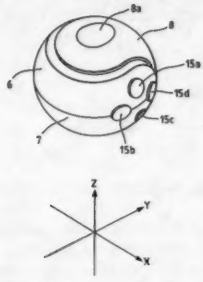
select signal generating means connected to said selecting means for generating said select signal denoting assignment of the selected data to said plurality of dots in accordance with the value of the low-order n-m bits of the first gradation data.

5,491,497

## MULTI-WAY INPUT DEVICE

Katsutoshi Suzuki, Iwaki, Japan, assignor to Alps Electric Co., Ltd., Tokyo, Japan

Filed Oct. 11, 1994, Ser. No. 321,650
Claims priority, application Japan, Jan. 18, 1993, 5-284089
Int. Cl.[6] G09G 5/08; A63F 9/00
U.S. Cl. 345—157 10 Claims




1. A multi-way input device comprising:
an upper housing having a first recess formed in a bottom surface thereof;
a lower housing having a second recess formed in a top surface thereof and opposed to the first recess;
an actuator supported rotatably within said first and second recesses and provided with a vertically extending rotatable shaft;
an operating member engaged with said rotatable shaft and adapted to rotate in three-dimensional directions of X, Y and Z axes together with rotation of said actuator;
a first switch for detecting the rotation in the X-axis direction of said operating member;
a second switch for detecting the rotation in the Y-axis direction of said operating member; and
a third switch for detecting the rotation in the Y-axis direction of said operating member.

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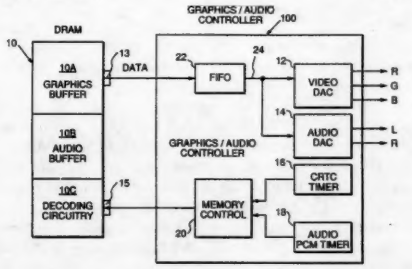
5,491,498

## DIGITAL AUDIO DELIVERY IN A GRAPHICS CONTROLLER ARCHITECTURE

Ryo Koyama, 343 Hawthorne Ave., Palo Alto, Calif. 94301, and Niall M. Bartlett, 1176 Britton Ave., San Jose, Calif. 95125

Filed Nov. 15, 1993, Ser. No. 152,624
Int. Cl.[6] G09G 1/14
U.S. Cl. 345—190 10 Claims




1. A graphics/audio control system comprising:
memory means for storing digital audio data and digital video data, the memory means including an output port for outputting a series of interleaved audio and video digital data, a control port for receiving address signals from a memory control unit, and decoding circuitry for decoding the address signals received by the control port;
a memory control unit responsive to digital video request signals and digital audio request signals and operative to send a series of address signals to the control port of the memory means, the series including address signals that correspond to digital audio data and digital video data stored in said memory means, said series of address signals being decoded by said decoding circuitry and causing the correspondingly stored digital audio data and digital video data to be interleavedly output via the output port of said memory means;
a video request signal timer for sending said digital video request signals to the memory control unit;
an audio request signal timer for sending said digital audio request signals to the memory control unit;
means for providing temporal storage of the interleaved audio and video digital data output from said output port of said memory means, said temporal storage means having an input and an output;
first means for receiving, from said temporal storage means, the digital video data portion of said interleaved audio and video digital data, and for converting said digital video data portion to analog video signals synchronously with the operation of said video request timer, said first means including means for separating said analog video signals into RGB component signals;
second means for receiving, from said temporal storage means, the digital audio data portion of said interleaved audio and video digital data, and for converting said digital audio data portion to analog audio signals synchronously with the operation of said audio request timer, said second means including means for separating said analog audio signals into left and right analog stereo signals; and
a single conductor data bus connecting the output port of said memory means to the input of said temporal storage means, for communicating said series of interleaved digital audio and video data signals from said output port of the memory means to the input of said temporal storage means.

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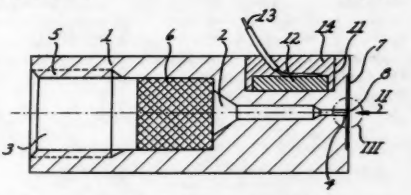
5,491,499

## INKJET NOZZLE FOR AN INKJET PRINTER

Christiaan P. M. Bibbe; Martinus J. Hester, both of Boxmeer; Wilhelmus J. C. Prinsen, Winssen, and Fransiscus J. M. van de Weyer, Boxmeer, all of, Netherlands, assignors to Stork X-Cel B.V., Boxmeer, Netherlands

PCT No. PCT/NL90/00006, § 371 Date Jan. 28, 1991, § 102(e) Date Jan. 28, 1991, PCT Pub. No. WO90/08038, PCT Pub. Date Jul. 26, 1990
PCT Filed Jan. 17, 1990, Ser. No. 730,977
Claims priority, application Netherlands, Jan. 20, 1989, 8900146
Int. Cl.[6] B41J 2/14
U.S. Cl. 347—47 10 Claims




1. An inkjet nozzle for an inkjet printer comprising
a housing (1) made of an essentially undeformable material and defining an inlet end (3) and an opposite outlet end (4),
an ink supply channel (2) extending through said housing and between said inlet and said outlet end, said ink supply channel including a first cylindrical portion of relatively large diameter adjacent said inlet end and a second cylindrical portion of relatively small diameter adjacent said outlet end, the diameter of said second cylindrical portion of said ink supply channel being between about 0.2 to 1 mm,

a separate thin flat plate (7) fixed to said outlet end of said housing so as to close said second cylindrical portion of said ink supply channel, said plate including an outflow channel (8) therethrough which is coaxially aligned with said second cylindrical portion of said ink supply channel and which has a diameter between about 3 and 30 microns and a length which is about 3 to 30 times greater than said diameter, and

an ultrasonic vibration element mounted to said housing at a location adjacent said outlet end.

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**5,491,500**

**INK JET HEAD**

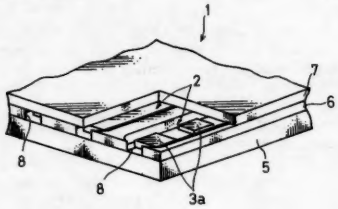
**Tetsuya Inui, Nara; Susumu Hirata, Ikoma; Yorishige Ishii, Yamatotakada; Kenji Ohta, Kitakatsuragi, and Kazuhiro Kimura, Sakai, all of, Japan, assignors to Sharp Kabushiki Kaisha, Japan**

**Filed Jan. 19, 1994, Ser. No. 183,410**

**Claims priority, application Japan, Jan. 22, 1993, 5-009436**

**Int. Cl.[6] B41J** *2/065;2/045*

**U.S. Cl. 347—48** **26 Claims**




1. An ink jet head comprising:

a head device that forms an ink-spraying unit, the head device being comprised of:

a nozzle from which ink is sprayed;

an ink passage that is connected to the nozzle; and

progressive-wave generating means for generating progressive waves in the ink inside the ink passage, which progressive waves proceed along the ink passage, in order to move ink toward the nozzle through the ink passage, the progressive-wave generating means comprising:

a row of piezoelectric devices that includes a first group of piezoelectric devices and a second group of piezoelectric devices, each group having a plurality of piezoelectric devices, the row of piezoelectric devices being aligned in a direction along the ink passage; and

electrode sections for applying ac voltages whose phases are different from each other to the first and second group of piezoelectric devices respectively,

whereby progressive waves are generated in the ink inside the ink passage by applying the ac voltages whose phases are different from each other to the first and second groups of piezoelectric devices respectively from the electrode sections;

wherein a length of each piezoelectric device in the direction along the ink passage is set to be equal to a distance between the piezoelectric devices.

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**5,491,501**

**MEDIUM FOR INK DELIVERY SYSTEMS**

**Steven J. Dietl, Ontario, and David P. Breemes, Palmyra, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.**

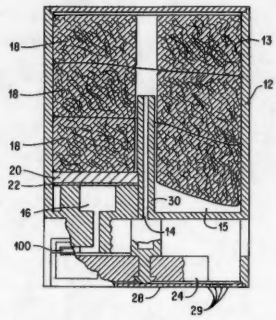
**Continuation-in-part of Ser. No. 885,704, May 19, 1992. This application Jun. 10, 1994, Ser. No. 257,979**

**Int. Cl.[6] B41J** *2/175*

**U.S. Cl. 347—86** **14 Claims**

1. A system for supplying liquid ink to a thermal ink jet printing apparatus, comprising:

a housing defining a chamber having a ventilation port and an outlet port;




a liquid ink retaining medium occupying at least a portion of the chamber; and

a scavenger member disposed across the outlet port, providing a capillary force greater than a capillary force provided by the medium, said scavenger member being substantially free of residual foaming surfactants and free of loose particles.

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**5,491,502**

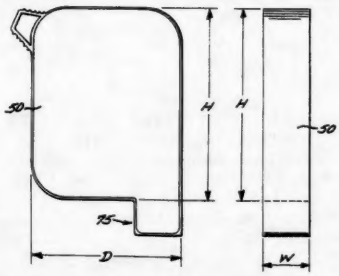
**THIN PEN STRUCTURE FOR THERMAL INK-JET PRINTER**

**David W. Swanson, Escondido; Timothy J. Carlin; George T. Kaplinsky, both of San Diego, all of Calif., and John P. Harmon, Vancouver, Wash., assignors to Hewlett-Packard Company, Palo Alto, Calif.**

**Continuation of Ser. No. 994,809, Jan. 22, 1992, abandoned. This application Jun. 28, 1994, Ser. No. 266,447**

**Int. Cl.[6] B41J** *2/175*

**U.S. Cl. 347—87** **17 Claims**




1. A thin ink cartridge pen for a printer, said printer including a pen carriage in which said pen is secured and which is moved along a carriage axis, said pen comprising:

an external pen frame structure defining a first external peripheral wall structure having opposed wall edges and first and second opposed side open regions within said opposed edges;

first and second thin cover members for covering said open regions of said frame structure, said planar members extending generally orthogonal to said carriage axis;

said peripheral wall structure and said cover members defining an open volume between said planar cover members and said opposed wall edges;

an ink reservoir occupying virtually all of said open volume when filled with ink, said reservoir free of ink-absorbing material;

a printhead snout structure extending from said frame structure;

a printhead supported by said snout structure and in fluid communication with said ink reservoir through an ink flow path extending through said snout structure, wherein said snout

structure supports said printhead away from said open volume to maximize an available ink reservoir capacity within said open volume;

said external frame structure having a width dimension W measured along a direction aligned with said carriage axis when said pen is installed in said carriage, a height dimension H and a depth dimension D, said height and depth dimensions measured along orthogonal directions which are also orthogonal to said carriage axis, and wherein said height and depth dimensions are at least twice said width dimension, thereby providing a pen which is relatively thin in a direction of movement of said pen carriage in relation to said height and width dimensions;

wherein said open volume is virtually equal to the product of H, W and D;

and wherein said pen has high volumetric efficiency in that said frame structure defines an ink reservoir which when filled with ink occupies virtually the entire volume defined by the frame structure and cover members, said ink reservoir is free of ink-absorbing material, and said printhead snout structure does not intrude into available reservoir volume within said pen body.

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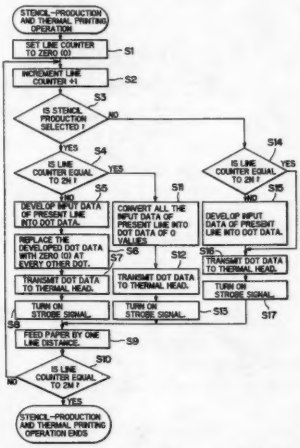
**5,491,503**

## STENCIL-PRODUCING APPARATUS

**Tetsuji Fuwa, Hashima, Japan, assignor to Brother Kogyo Kabushiki Kaisha, Aichi, Japan**

**Filed Sep. 24, 1993, Ser. No. 125,789**
**Claims priority, application Japan, Sep. 24, 1992, 4-280888**
**Int. Cl.[6] B41J** *2/32*
**U.S. Cl. 347—171** **17 Claims**




1. An apparatus capable of producing a desired stencil from heat-sensitive stencil medium in a stencil-producing mode and capable of thermally printing a desired image on heat-sensitive imaging medium in a printing mode, the apparatus comprising:

a plurality of thermal elements aligned in a main scanning direction;

thermal element control means for receiving one set of dot data including a plurality of dot data representative of a desired one line image and for selectively energizing thermal elements according to the plurality of dot data, said thermal element control means selectively preventing said plurality of thermal elements from being energized irrespective of the plurality of dot data in the stencil-producing mode; and

supporting means for supporting a heat-sensitive stencil medium in direct contact with said plurality of thermal elements in the stencil-producing mode allowing the selectively energized thermal elements to selectively heat the heat-sensitive stencil medium to form therein a row of dot-shaped perforations extending in the main scanning direction to produce the desired one line image corresponding to the selectively energized thermal elements in the stencil-producing mode and for supporting a heat-sensitive imaging medium in direct contact with said plurality of thermal elements in the printing mode allowing the selectively energized thermal elements to selectively heat the heat-sensitive imaging medium to form thereon a row of dot-shaped images extending in the main scanning direction that correspond to the desired one line image.

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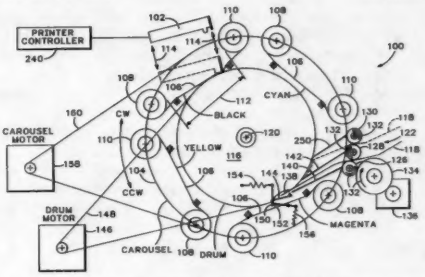
**5,491,504**

## THERMAL TRANSFER PRINTER INK RIBBON-CHANGING CAROUSEL APPARATUS AND METHOD

**H. Erwin Grellman, Beaverton, Oreg., assignor to Textronix, Inc., Wilsonville, Oreg.**

**Filed Jul. 13, 1993, Ser. No. 91,487**
**Int. Cl.[6] B41J** *2/325*
**U.S. Cl. 347—176** **22 Claims**




7. An apparatus for printing a multicolor image on a print medium, comprising:

a generally cylindrical carousel having an axis of rotation and a periphery around which a plurality of colorant-carrying ribbons are attached;

a print head positioned outside the carousel periphery, the print head having a linear array of printing elements aligned parallel to the axis of rotation;

a media drum coaxially mounted within the carousel, the print medium being wrapped around the media drum;

a carousel motor rotating the carousel to sequentially index it selected one of the plurality of ribbons to a position adjacent to the print head thereby permitting the plurality of ribbons to be selected and indexed;

a print head positioner moving the linear array of printing elements between a retracted position that allows the carousel to be rotated and a ribbon-contacting position that forms a nip between the selected one of the plurality of ribbons and the media drum;

a drum motor rotating the media drum to move the print medium and the selected one of the plurality of ribbons through the nip in sequential passes, the drum motor sequentially passing the, print medium through the nip to permit subsequently selected ones of the plurality of ribbons to contact the printing elements of the print head; and

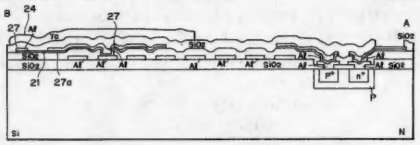
a print head array driver controlling transfer of colorant from the sequentially indexed and selected one of the plurality of ribbons during sequential and subsequent passes of the print medium and the plurality of ribbons through the nip, thereby printing the multicolor image on the print medium.

## 5,491,505

## INK JET RECORDING HEAD AND APPARATUS HAVING A PROTECTIVE MEMBER FORMED ABOVE ENERGY GENERATORS FOR GENERATING ENERGY USED TO DISCHARGE INK

**Toshio Suzuki, Inagi; Asao Saito; Makoto Shibata, both of Yokohama; Junichi Kobayashi, Ayase; Hirokazu Komuro; Toshihiro Mori, both of Yokohama; Shuji Koyama; Sakai Yokoyama, both of Kawasaki; Ryoichi Koizumi, Yokohama, and Keiichi Murakami, Hachioji, all of, Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan**

**Continuation of Ser. No. 804,594, Dec. 10, 1991, abandoned.**
**This application Aug. 2, 1994, Ser. No. 284,266**
**Claims priority, application Japan, Dec. 12, 1990, 2-409895; Jan. 18, 1991, 3-004736; Mar. 4, 1991, 3-061045**
**Int. Cl.[6] B41J** *2/34;2/335;2/35*
**U.S. Cl. 347—203** **13 Claims**



**1**. An ink jet recording head comprising:

an energy generating member for generating energy for discharging ink and a circuit electrically connected to said energy generating member, said energy generating member and said circuit being disposed on a substrate;

an insulative layer formed on said energy generating member and said circuit; and

a conductive protecting member formed above said energy generating member and said circuit on said insulative layer, said protecting member extending to all areas where the ink directly contacts the substrate, but not extending to portions of the substrate where the ink does not contact the substrate.

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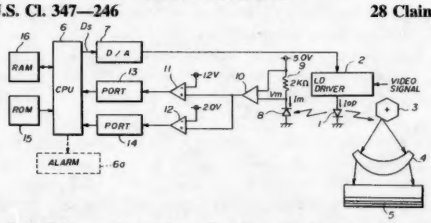
## 5,491,506

## LIGHT QUANTITY SETTING VALUE DETERMINATION WITH IMPROVED RELIABILITY

**Takahiro Yagishita, Tokyo, and Hajime Yamazaki, Yokohama, both of, Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan**

**Filed Oct. 23, 1992, Ser. No. 966,082**
**Claims priority, application Japan, Jan. 31, 1991, 3-286709**
**Int. Cl.[6] G01D** *9/42*
**U.S. Cl. 347—246** **28 Claims**




**1**. A light quantity setting value determination apparatus comprising:

light quantity sensing means for sensing when a light quantity emitted by a light emitting means is equal to any one of a plurality of different predetermined light quantities, said light quantity sensing means then providing a plurality of light sensing signals corresponding to said plurality of different predetermined light quantities;

setting value determination means for determining in response to said plurality of light sensing signals provided by said light quantity sensing means a plurality of light quantity setting values corresponding to said different predetermined light quantities, said plurality of light quantity setting values being then used for driving said light emitting means so that said light emitting means emits said plurality of different predetermined light quantities corresponding to said plurality of light sensing signals; and

abnormal condition sensing means for sensing when said light quantity sensing means does not operate correctly, said abnormal condition sensing means then processing a predetermined operation so as to prevent an undesirable condition being caused by said incorrect operation,

wherein said abnormal condition sensing means senses when said light quantity sensing means does not operate correctly by sensing when a sequence of said plurality of light sensing signals provided by said light quantity sensing means is not correct.

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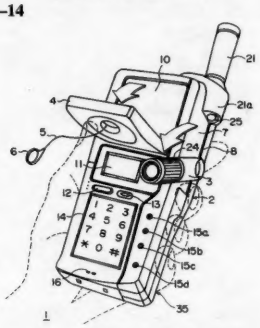
## 5,491,507

## VIDEO TELEPHONE EQUIPMENT

**Koichi Umezawa, Tokyo; Hiroyuki Kuriyama, Yokohama; Takanori Nishiyama, Mitaka; Kiyoshi Ishida, Yokohama, and Iwao Ishinabe, Koganei, all of, Japan, assignors to Hitachi, Ltd., Japan**

**Filed Oct. 22, 1993, Ser. No. 139,700**
**Claims priority, application Japan, Jan. 23, 1992, 4-286467**
**Int. Cl.[6] H04M** *11/00*
**U.S. Cl. 348—14** **12 Claims**



**1**. A video telephone equipment, comprising:

signal processing means for permitting at least either of a vocal communication and a visual communication;

a speaker which emits received speech for the vocal communication;

a microphone which accepts speech to-be-transmitted for said vocal communication;

a display panel which displays a received picture for the visual communication;

a camera which takes a picture to-be-transmitted for said visual communication;

a control panel through which a user of said video telephone equipment gives an operation command to said signal processing means;

a casing which is provided with said display panel, said speaker and said microphone; and

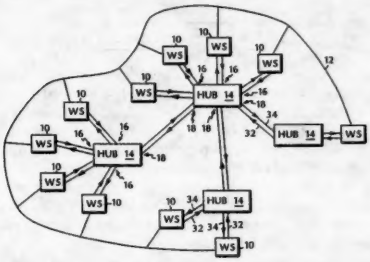
camera holding means for holding said camera, said camera holding means having a shaft with which said camera is mounted on said casing so that an angular position of said camera relative to said casing is alterable, wherein

said display panel is arranged between said speaker and said microphone on said casing.

## 5,491,508
## PC VIDEO CONFERENCING

**Mark Friedell, Arlington, and Martin L. Moeller, Watertown, both of Mass., assignors to Lotus Development Corporation, Cambridge, Mass.**

**Filed Mar. 21, 1994, Ser. No. 215,501**
**Int. Cl.[6] H04N 7/10**
**U.S. Cl. 348—16** **16 Claims**




1. A video signal distribution hub for a video conferencing network in which workstations generate RF video signals, said hub comprising:

a plurality of workstation ports to which said workstations may be connected, each workstation port including an input line for receiving a video signal from a workstation connected thereto and an output line for sending a video signal to a workstation connected thereto;

a plurality of hub ports through which other hubs can be connected, each of said hub ports including an input line for receiving video signals from a hub connected to that port and an output line for sending video signals to the hub connected thereto;

a first circuit module generating an output signal for each of the workstation ports, said first circuit module combining all of the video signals received over the input lines of all of the workstation ports and all of the hub ports to generate a combined signal, wherein said first includes a distribution network receiving the combined signal and generating therefrom the output signal for each of the workstations ports; and

a second circuit module including an RF amplifier for each of said hub ports, said RF amplifier for each hub port supplying its output to the output line for that hub port, and wherein for each of said hub ports said second circuit module combines the video signals received over the input lines of all of the workstation ports with the video signals received over the input lines of all of the other hub ports to generate a composite signal that is supplied to an input of the RF amplifier for that hub port.

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## 5,491,509
## FORCED INTRA-FRAME CODING METHOD

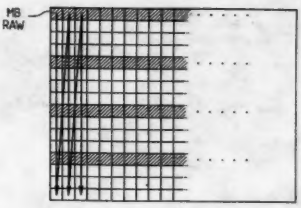
**Jechang Jeong, Seoul, and Wooyoun Ahn, Suwon, both of, Rep. of Korea, assignors to Samsung Electronics Co., Ltd., Kyungki, Rep. of Korea**

**Filed Jun. 30, 1994, Ser. No. 268,451**
**Claims priority, application Rep. of Korea, Jun. 30, 1993, 93-12087**
**Int. Cl.[6] H04N 7/50**
**U.S. Cl. 348—402** **10 Claims**

1. In a method of selectively intra/inter-frame coding video data divided into a plurality of blocks of a predetermined size, a forced intra-frame coding method comprising the steps of:

(a) receiving blocks of a video frame in a vertical direction with respect to said video frame to produce respective received video data blocks;

(b) selectively intra-frame and inter-frame coding said received video data blocks and forcibly intra-frame coding a plurality




of horizontally adjacent blocks to produce a forcibly intra-frame coded block line; and

(c) shifting respective positions of said forcibly intra-frame coded block line whenever one frame of video data is finished coding.

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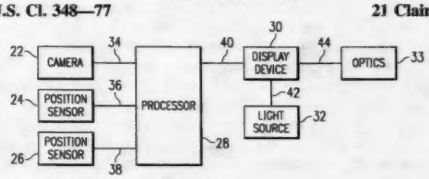
## 5,491,510
## SYSTEM AND METHOD FOR SIMULTANEOUSLY VIEWING A SCENE AND AN OBSCURED OBJECT

**Robert J. Gove, Plano, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.**

**Filed Dec. 3, 1993, Ser. No. 161,831**
**Int. Cl.[6] H04N 7/18**
**U.S. Cl. 348—77** **21 Claims**




1. An imaging system comprising:

a sensor for producing an output representative of the distance between a viewer and a first object and of the relative position and perspective of the viewer with respect to the first object in real-time;

facilities for storing information representative of an image of a second object including nonobservable portions thereof;

a processor responsive to said output for manipulating said information and for generating signals representing the image of the second object as having a distance from the viewer and a relative position and perspective to the viewer which is the same as the distance, relative position, and perspective applicable to the first object; and

a display device for converting said signals into a virtual image and for permitting the viewer to simultaneously observe the first object and the virtual image.

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## 5,491,511
## MULTIMEDIA CAPTURE AND AUDIT SYSTEM FOR A VIDEO SURVEILLANCE NETWORK

**James A. Odle, Rte. 1, Box 127, Lake Norden, S. Dak. 57248**

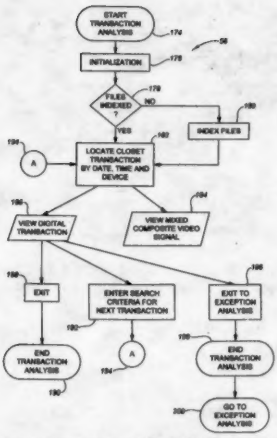
**Filed Feb. 4, 1994, Ser. No. 191,491**
**Int. Cl.[6] H04N 7/18**
**U.S. Cl. 348—153** **10 Claims**

1. A multimedia capture and audit system comprising:

a video surveillance network that monitors a plurality of electronic devices, each of which produce digital transaction data representative of each of one or more physical transactions registered by the electronic device, by using one or more video cameras to generate video signals monitoring the electronic devices;

node means for capturing a plurality of occurrences of digital transaction data from each of the plurality of electronic devices;

first memory means for storing the video signals;




second memory means separate from the first memory means for storing the digital transaction data as part of a database;

control means, operably coupled to the node means and the first and second memory means, for storing, in response to an occurrence of any of the plurality of occurrences of digital transaction data, a mixed composite video signal on the first memory means using a unique system pointer and for storing each of the plurality of occurrences of the digital transaction data and the unique system pointer in the database on the second memory means, the mixed composite video signal comprising a video overlay signal representative of each of the occurrences of the digital transaction data and a video signal of a corresponding physical transaction occurring at the electronic device concurrent with each occurrence represented by the digital transaction data; and

audit means operably coupled to the first and second memory means for auditing the physical transactions registered by the electronic devices by subsequently analyzing the database to identify a user-defined suspect occurrence of the digital transaction data and reviewing the video signal of the corresponding physical transaction stored on the first memory means by using the unique system pointer stored in the database on the second memory means to access a corresponding unique system pointer indicating the suspect occurrence of the digital transaction data stored in the mixed composite video signal stored on the first memory means.

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## 5,491,512
## SOLID STATE IMAGE SENSOR DEVICE AND ITS DRIVING METHOD

**Keijirou Itakura; Toshihide Nobusada, both of Ibaraki; Yasuyuki Toyoda, Minou; Yukio Saitoh, Uji; Noboru Kokusenya, Osaka; Ryouichi Nagayoshi, Koube; Hironori Tanaka, Takatsuki, and Masayoshi Ozaki, Amagasaki, all of, Japan, assignors to Matsushita Electronics Corporation, Osaka, Japan**

**Continuation of Ser. No. 169,001, Dec. 20, 1993, abandoned. This application Mar. 31, 1995, Ser. No. 416,437**

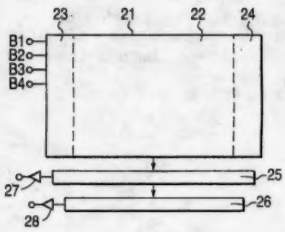
**Claims priority, application Japan, Dec. 28, 1992, 4-348108; Dec. 28, 1992, 4-348109; Dec. 28, 1992, 4-348110**

**Int. Cl.[6] H04N** *5/335;3/15*

**U.S. Cl. 348—321** **6 Claims**

1. A solid state image sensor comprising

a matrix of photosensitive elements having a first image segment adapted to accumulate first signal charges corresponding to a first aspect ratio and a second image segment adapted to accumulate second signal charges corresponding to a second aspect ratio, wherein said second image segment is included within said first image segment and is situated centrally in said first image segment,




a plurality of vertical shift registers disposed adjacent to columns of said photosensitive elements for a vertical transfer of said first signal charges including said second signal charges,

a first horizontal shift register corresponding to said first aspect ratio adapted to accept said first signal charges from said vertical shift registers, said first horizontal shift register disposed under said first image segment, and

a second horizontal shift register corresponding to said second aspect ratio adapted to accept only said second signal charges from said first horizontal shift register, said second horizontal shift register having the same number of transfer stages as the number of said photosensitive elements in one row of said second image segment, disposed in parallel with said first horizontal shift register, and disposed just under said second image segment through said first horizontal shift register.

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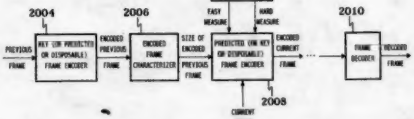
## 5,491,513
## BIT RATE CONTROLLER FOR ENCODING VIDEO SIGNALS

**Larry Wickstrom; Michael Keith, both of Beaverton, and Adnan Alattar, Hillsboro, all of Oreg., assignors to Intel Corporation, Santa Clara, Calif.**

**Continuation of Ser. No. 119,438, Sep. 9, 1993, which is a continuation-in-part of Ser. No. 78,931, Jun. 16, 1993, Pat. No. 5,351,085. This application Jun. 28, 1994, Ser. No. 267,161**

**Int. Cl.[6] H04N** *7/13*

**U.S. Cl. 348—390** **22 Claims**




1. A computer-implemented process for encoding video signals, comprising the steps of:

(a) providing a reference characterization of encoded frame encoded using a first encoding process relative to encoded frames encoded using a second encoding process for a variety of frame;

(b) encoding a previous frame using the first encoding process;

(c) characterizing the encoded previous frame; and

(d) encoding a current frame using the second encoding process, wherein the current frame is encoded in accordance with the reference characterization of step (a) and the characterization of the encoded previous frame of step (c), wherein:

the reference characterization comprises an easy measure and a hard measure, wherein:

the easy measure corresponds to the size of a first encoded frame relative to the size of a second encoded frame, wherein:

the first encoded frame is a first frame encoded using the first encoding process;

the second encoded frame is a second frame encoded using the second encoding process; and

the first frame and the second frame are frames of a first video sequence for which motion compensation provides an accurate prediction; and

the hard measure corresponds to the size of a third encoded frame relative to the size of a fourth encoded frame, wherein:

the third encoded frame is a third frame encoded using the first encoding process;

the fourth encoded frame is a fourth frame encoded using the second encoding process; and

the third frame and the fourth frame are frames of a second video sequence for which motion compensation provides an inaccurate prediction, wherein the accurate prediction is more accurate than the inaccurate prediction;

step (c) comprises the step of characterizing the size of the encoded previous frame; and

step (d) comprises the step of encoding the current frame based on the size of the encoded previous frame relative to the easy measure and the hard measure.

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## 5,491,514

## CODING APPARATUS, DECODING APPARATUS, CODING-DECODING APPARATUS FOR VIDEO SIGNALS, AND OPTICAL DISKS CONFORMING THERETO

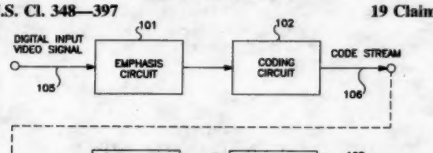
**Hideki Fukuda, Kadoma; Masahiro Honjo, Sakai, and Hideaki Shibata, Osaka, all of, Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan**

**Filed Jan. 27, 1994, Ser. No. 188,140**

**Claims priority, application Japan, Jan. 28, 1993, 5-012286; Jul. 14, 1993, 5-174068; Jan. 4, 1993, 5-247893; Jan. 14, 1993, 5-256844**

**Int. Cl.[6] H04N** *7/26*

**U.S. Cl. 348—397** **19 Claims**




1. A video signal coding and decoding apparatus, comprising:

emphasis means, having a nonlinear characteristic for increasing degree of signal enhancement of said video signal as amplitude of said video signal decreases, and for setting degree of signal enhancement at a desired level and for generating an output signal,

coding means for generating a code row by compression coding the output signal from the emphasis means

decoding means for decoding the code row and for generating a decoded video signal, and

de-emphasis means having a nonlinear characteristic for increasing degree of signal suppression of said decoded video signal as amplitude of said decoded video signal decreases, and for reproducing said video signal by suppressing the decoded video signal, wherein the emphasis means comprises:

means for extracting high frequency components from said video signal;

first limiter means for passing an original amplitude when the magnitude of the high frequency components is not more than a first specified level L1, and limiting the output amplitude of L1 when the magnitude of the high frequency components is more than L1;

first multiplying means for multiplying the output signal of the first limiter means by a first coefficient X1; and

means for adding the output signal of the first multiplying means to the input signal; and

wherein the de-emphasis means comprises:

means for extracting high frequency components of the decoded video signal;

second limiter means for passing respective original amplitudes when the respective magnitudes of the high frequency components of the decoded video signal is not more than a second specified level L2 given in a form of (1+X1)×L1, and limiting the respective output amplitudes to L2 when the magnitude of the respective high frequency components is more than L2;

second multiplying means for multiplying the output signal of the second limiter means by a second coefficient X2; and

means for subtracting the output signal of the second multiplying means from the coded video signal.

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## 5,491,515

## IMAGE CODING/DECODING APPARATUS FOR EFFICIENT PROCESSING BY SHARING MEMBERS IN CODING/LOCAL DECODING AND DECODING PROCESSING

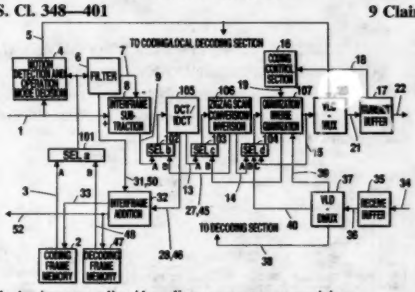
**Mitsuyoshi Suzuki, Kamakura, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan**

**Filed Apr. 27, 1993, Ser. No. 54,386**

**Claims priority, application Japan, Apr. 28, 1992, 4-110402**

**Int. Cl.[6] H04N** *7/50*

**U.S. Cl. 348—401** **9 Claims**




1. An image coding/decoding apparatus comprising:

a first selector for receiving a locally decoded image signal of a preceding time frame and a decoded image signal for a preceding time frame, for selecting between the received signals and for outputting a first selected signal;

a filter for receiving the first selected signal and for outputting a filtered signal;

an interframe subtractor for receiving the filtered signal and an input image signal and for outputting an interframe subtracted signal;

a second selector for receiving the interframe subtracted signal and a zig-zag scan inverted signal, for selecting one of the interframe subtracted signal and the zig-zag signal and for outputting a second selected signal;

a discrete/inverse discrete cosine transformer for receiving the second selected signal, for transforming the second selected signal and for outputting a transformed signal;

a third selector for receiving the transformed signal and an inverse quantized signal and for outputting a third selected signal;

a zig-zag scan converter/inverter for receiving the third selected signal, for converting the third selected signal and for outputting the converted signal;

a receive buffer for receiving coded compressed data signals, for storing the coded compressed data signals and for outputting the coded compressed data signals;

a variable length decoder and demultiplexer for receiving the coded compressed data signals, for decoding and demultiplex-

ing the coded compressed data signals and for outputting decoded and demultiplexed data signals;

a fourth selector for receiving the converted signal, the decoded and demultiplexed data signals and an inverse quantized signal and for outputting a fourth selected signal;

a quantizer/inverse quantizer for receiving the fourth selected signal, for quantizing the fourth selected signal and for outputting a quantized signal;

a variable length coder and multiplexer for receiving a coding motion vector signal and the quantized signal, for coding and compressing the received coding motion vector and quantized signals and for outputting the coded compressed signals;

a transmit buffer for receiving the coded compressed data signals for storing the coded compressed data signals and for outputting the coded compressed data signals;

an interframe adder for receiving an inverse transformed signal and the filtered signal and for outputting an added decoded image signal;

a decoding frame memory for receiving the added decoded image signal, for storing the decoded image signal and for outputting the decoded image signal.

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## 5,491,516

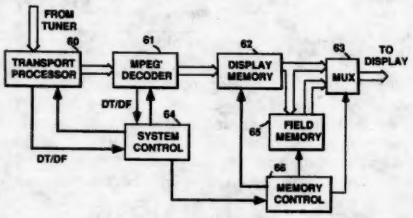
## FIELD ELIMINATION APPARATUS FOR A VIDEO COMPRESSION/DECOMPRESSION SYSTEM

**Scott D. Casavant, East Windsor, N.J., and Tristan Savatier, Los Angeles, Calif., assignors to RCA Thomson Licensing Corporation, Princeton, N.J.**

**Filed Jan. 14, 1993, Ser. No. 4,753**

**Int. Cl.[6] H04N** *7/137*

**U.S. Cl. 348—415** **4 Claims**




1. Apparatus for receiving a compressed video signal wherein ones of substantially redundant fields of video signal have been excised and frames of video signal were reconstructed from the remaining fields after said substantially redundant fields were excised, said compressed video signal including information DT/DF indicative of fields of compressed video signal having been excised and the order in which fields of the reconstructed frames should be displayed, said apparatus comprising:

means for receiving said compressed video signal;

means responsive to said received compressed video signal for separating said information DT/DF;

means responsive to said received compressed video signal for decompressing said compressed video signal to provide output frames of video signal; and

means responsive to said information DT/DF for repeating ones of fields of said output frames and responsive to said information DT/DF for providing respective output fields in a predetermined time sequence.

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## 5,491,517

## SYSTEM FOR IMPLANTING AN IMAGE INTO A VIDEO STREAM

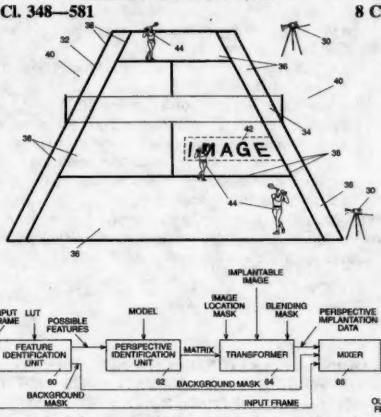
**Haim Kreitman, Kfar Saba; Dan Bar-El, Herzlia; Yoel Amir, Kfar Saba, and Ehud Tirosh, Tel Aviv, all of, Israel, assignors to Scitex America Corporation, Bedford, Mass.**

**Filed Jan. 19, 1995, Ser. No. 375,464**

**Claims priority, application Israel, Mar. 14, 1994, 108957**

**Int. Cl.[6] H04N** *5/265;5/275*

**U.S. Cl. 348—581** **8 Claims**




1. A method for implanting an image into a selected one at a time of a plurality of video frames representing a stream of action occurring within a background space, the space having fixed planar surfaces and being scanned by at least one video camera, the method comprising the steps of:

generating a model, independent of said plurality of video frames, of a selected one of said fixed surfaces, said model comprising a representation of geometrical features characterizing said surface; and

utilizing said model for implanting said image into said frames, said step of utilizing comprising the step of perspectively distorting said model.

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## 5,491,518

## EQUALIZATION APPARATUS WITH FAST COEFFICIENT UPDATING OPERATION

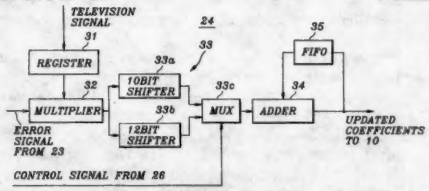
**Young-Sang Kim, Seoul, Rep. of Korea, assignor to Daewoo Electronics Co., Ltd., Seoul, Rep. of Korea**

**Filed Jan. 18, 1995, Ser. No. 375,326**

**Claims priority, application Rep. of Korea, Jan. 18, 1994, 1994-755**

**Int. Cl.[6] H04N** *5/21*

**U.S. Cl. 348—607** **3 Claims**




1. An equalization apparatus for use in a television signal receiving system, which includes an equalizing filter having a set of filter coefficients for equalizing a received television signal distorted from an original signal in a transmission channel to produce a filtered output signal, wherein the received television signal includes a plurality of data samples and the filtered output signal has a corresponding plurality of filter output data samples; and error signal generating means for storing a set of error values, and for generating, in response to a filtered output data sample, an

error signal corresponding to said filtered output data sample; and updating circuit for generating, in response to the data sample and the error signals, a set of updated filter coefficients as the set of filter coefficients for the equalizer filter, characterized in that said updating circuit comprises:

a shift register for storing and shifting the data sample to provide a set of the data samples;

a multiplier for multiplying said error signal with the set of the data samples to provide a set of error weighted data samples;

a scaling circuit, in response to a first control signal, for scaling down the set of error weighted data samples with a first scale value in order to generate a first set of scaled error weighted data samples and, in response to a second control signal, for scaling down the set of error weighted data samples with a second scale value to generate a second set of scaled error weighted data samples;

adder means for adding the first or the second set of scaled error weighted data samples to a set of previous filter coefficients in order to produce said set of updated filter coefficients as an output of the updating circuit;

FIFO buffer means for storing the set of updated filter coefficients as the set of previous filter coefficients for the adder means; and

control means for generating the second control signal when the mean square error of the filtered output signal is identical to or smaller than a predetermined threshold value and for generating the first control signal when the mean squared error is greater than the predetermined threshold value.

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**5,491,519**

## PRE-PROCESSING FILTER APPARATUS FOR USE IN AN IMAGE ENCODING SYSTEM

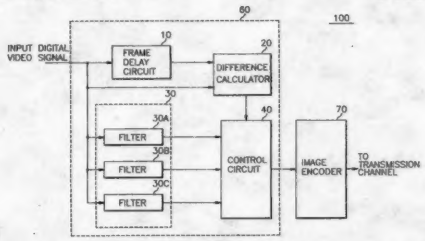
**Jong-Hoon Kim, Seoul, Rep. of Korea, assignor to Daewoo Electronics Co., Ltd., Seoul, Rep. of Korea**

**Filed Dec. 16, 1994, Ser. No. 357,797**

**Claims priority, application Rep. of Korea, Dec. 16, 1993, 1993-27996**

**Int. Cl.[6] H04N** *5/21*

**U.S. Cl. 348—620** **2 Claims**




1. A pre-processing filter apparatus for use in an image encoding system for adaptively filtering an input digital video signal wherein the input digital video signal includes a plurality of frames, which comprises:

means for delaying a current frame of the input digital video signal by one frame interval;

means for generating a difference signal representing the difference between an averaged pixel value for N×N pixels (where N is a positive integer) of a previous frame which is the delayed current frame and an averaged pixel value for N×N pixels of the current frame, at an identical area of the previous frame and the current frame;

two or more filtering means arranged in parallel for filtering the input digital video signal, respectively, each of said filtering means having different cutoff frequencies; and

control means for generating one of the filtered digital video signals in response to the difference signal.

**5,491,520**

## CONTOUR CORRECTING CIRCUIT FOR SHARPENING RISING AND FALLING EDGES OF VIDEO SIGNALS

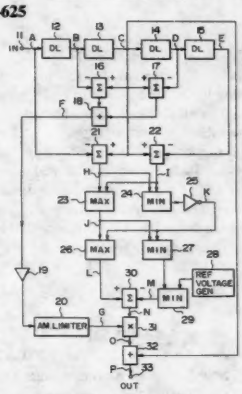
**Takahiro Nozawa, Ryugasaki; Yukio Nishizawa, Kawaguchi, and Naoki Tanifuji, Hachioji, all of, Japan, assignors to Victor Company of Japan, Ltd., Yokohama, Japan**

**Filed Jun. 24, 1994, Ser. No. 265,727**

**Claims priority, application Japan, Jun. 24, 1993, 5-177340; Jun. 24, 1993, 5-177341**

**Int. Cl.[6] H04N** *5/208*

**U.S. Cl. 348—625** **5 Claims**




1. A contour correcting circuit, comprising:

delaying means for delaying an inputted first signal by a first delay time, a second delay time longer than the first delay time, a third delay time longer than the second delay time, and a fourth delay time longer than the third delay time in sequence, respectively and outputting a second signal, a third signal, a fourth signal and a fifth signal delayed by the first, second, third and fourth delay times, respectively;

means for forming a first contour signals on the basis of a sixth signal obtained by subtracting the second signal from the third signal and a seventh signal obtained by subtracting the fourth signal from the third signal;

means for forming a second contour signal representative of contour components on the basis of the first signal, the third signal and the fifth signal;

means for forming an eighth signal representative of contour emphasizing components on the basis of the first contour signal and the second contour signal; and

means for forming a contour corrected output signal by adding the third signal and the eighth signal.

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**5,491,521**

## SCAN VELOCITY MODULATION SYSTEM WITH AUXILIARY VERTICAL DEFLECTION TOWARDS BRIGHT SIDE OF VIDEO SIGNAL TRANSITIONS

**Werner Boie; Nadine Bolender, both of Strasbourg, and Jean-Claude Chevet, Fegersheim, all of, France, assignors to Thomson Consumer Electronics S.A., Courbevoie, France**

**Continuation of Ser. No. 54,563, Apr. 29, 1993, abandoned. This application Oct. 29, 1993, Ser. No. 145,981**

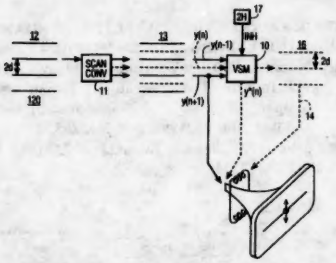
**Claims priority, application European Pat. Off., Apr. 30, 1992, 92401233**

**Int. Cl.[6] H04N** *3/32;5/44*

**U.S. Cl. 348—626** **35 Claims**

1. A method for improving sharpness of pictures displayed with a line structure on a picture tube having a scanning beam, comprising:

scanning said picture tube with said scanning beam to produce said pictures;




providing auxiliary vertical deflection for vertically deflecting said scanning beam in response to brightness transitions having at least a vertical component of a video signal applied to said picture tube;

enabling said auxiliary vertical deflection for said scanning beam only for lines which are located in-between and are interpolated from original lines of a field: and

controlling said auxiliary vertical deflection such that at said brightness transitions said beam is deflected to the bright side of said brightness transitions of said video signal.

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**5,491,522**

**LUMINANCE AND COLOR SIGNAL ISOLATION DEVICE**

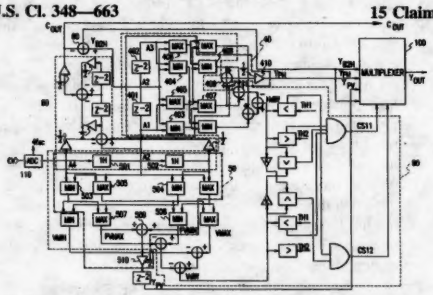
**Seong H. Hong, Seoul, Rep. of Korea, assignor to Goldstar Co., Ltd., Seoul, Rep. of Korea**

**Filed Jun. 10, 1994, Ser. No. 258,001**

**Claims priority, application Rep. of Korea, Jun. 11, 1993, 1993-10618**

**Int. Cl.[6] H04N** *9/78*

**U.S. Cl. 348—663** **15 Claims**



1. A luminance and color signal isolation device, comprising:

a detector of a horizontal nonlinear luminance signal which is detecting a luminance signal from a synthesis picture signal as an input without having any change to horizontal direction; said detector of the horizontal direction nonlinear luminance signal detecting the luminance signal (Yph) using the following equation:

$$Yph=\{MAX(MIN(A1,A2),MIN(A2,A3))+MIN(MAX(A1,A2),MAX(A2,A3))\}/2$$

where,

MAX(,)=the bigger value of two values;

MIN(,)=the smaller value of two values; and

A1,A2,A3=the synthesis signals, and A2 is the basis, A1 is ahead of by two sample period, A3 is delayed by two sample period;

a detector of a vertical nonlinear luminance signal which is detecting the luminance signal with the synthesis picture signal as an input without having any change to vertical direction; said detector of the vertical direction nonlinear luminance signal detecting the luminance signal (Ypv) using the following equation:

$$Ypv=\{MAX(MIN(A4,A2),MIN(A2,A5))+MIN(MAX(A4,A2),MAX(A2,A5))\}/2$$

where,

MAX(,)=the bigger value of two values;

MIN(,)=the smaller value of two values; and

A1,A2,A3=the synthesis signals, and A2 is the basis, A1 is ahead of by one line period, A3 is delayed by one line period;

a color signal detector which is detecting a color signal from the synthesis picture signal;

a delay device which is delaying the synthesis picture signal for a certain time in order to be in synchronism with the output signal of the color signal detector;

a subtractor which is subtracting an output signal of the color signal detector from the output signal of the delay device;

a control signal generator which is both detecting any change of the synthesis picture signal in both the vertical direction or horizontal direction and generating control signals of CS11 and CS12; and

a multiplexer which is alternatively selecting one of the luminance signal among the output signals from said subtractor, said detector of vertical nonlinear luminance signal, and said detector of horizontal nonlinear luminance signal using the control signals of CS11 and CS12 as the input signals from the control signal generator.

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**5,491,523**

**IMAGE MOTION VECTOR DETECTING METHOD AND MOTION VECTOR CODING METHOD**

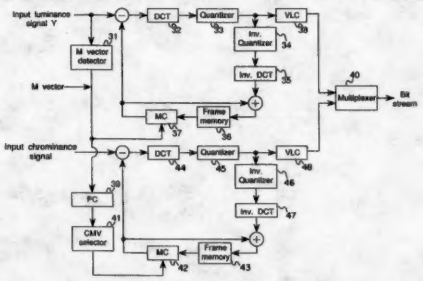
**Akihiro Sato, Osaka, Japan, assignor to Matsushita Electric Industrial Co. Ltd., Osaka, Japan**

**Filed May 31, 1994, Ser. No. 251,352**

**Claims priority, application Japan, Jun. 1, 1993, 5-130838**

**Int. Cl.[6] H04N** *7/50*

**U.S. Cl. 348—699** **5 Claims**




1. A motion vector detection method for dividing the image frame into N blocks (where N is a natural number) and detecting the motion vectors between adjacent frames of each block, comprising steps of

detecting a motion vector from a block of a luminance signal,

defining a reference motion vector of a block of a chrominance signal corresponding to the block of the luminance signal in accordance with the motion vector detected in the foregoing step,

setting plural candidate motion vectors around the reference motion vector,

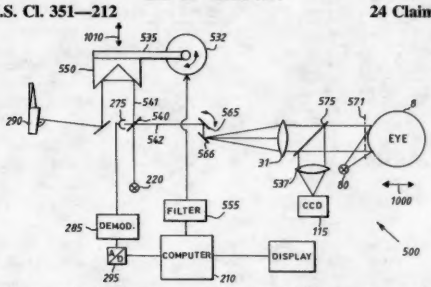
obtaining correlations between two blocks of adjacent frames for the reference motion vector and the plural candidate motion vectors, and

defining a motion vector with the greatest correlation as the motion vector of the chrominance signal.

## 5,491,524
## OPTICAL COHERENCE TOMOGRAPHY CORNEAL MAPPING APPARATUS

**Thomas Hellmuth, Danville, and Jay Wei, Fremont, both of Calif., assignors to Carl Zeiss, Inc., Thornwood, N.Y.**

**Filed Oct. 5, 1994, Ser. No. 318,141**
**Int. Cl.[6] A61B** *3/10*
**U.S. Cl. 351—212** **24 Claims**




**1**. An optical coherence tomography (OCT) corneal mapping apparatus which comprises:

an OCT apparatus which is comprised of means for altering a reference beam path;

raster scanning means for raster scanning sampling optical output from the OCT apparatus;

curved mirror means for transferring the sampling optical output from the raster scanning means to an eye and for transferring the sampling optical output reflected from the eye back to the OCT apparatus through the raster scanning means; and

analyzing means, coupled to the raster scanning means, the altering means, and reference and sampling interaction output from the OCT apparatus for causing: (a) the raster scanning means to move the sampling optical output to points in a raster; (b) the altering means to alter the length of the reference beam path over a predetermined amount at each of the points; and (c) determination of the corneal mapping from the reference and sampling interaction output at the points in the raster.

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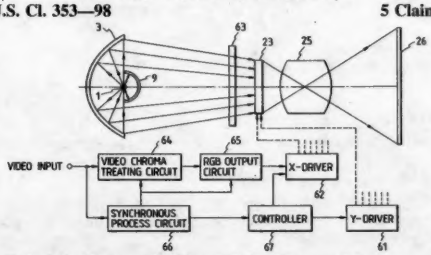
## 5,491,525
## ILLUMINATION UNIT FOR LIQUID CRYSTAL PROJECTION DISPLAY APPARATUS AND LIQUID CRYSTAL DISPLAY APPARATUS HAVING IT USED

**Futoshi Yamasaki, Chigasaki; Yoshio Ariki, Yokohama; Masaharu Deguchi, Shimizu; Takashi Kakuda, Yokohama; Takanori Hisada, Yokohama, and Takesuke Maruyama, Yokohama, all of, Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed Nov. 19, 1993, Ser. No. 154,928**
**Claims priority, application Japan, Nov. 24, 1992, 4-312529; Feb. 5, 1993, 5-017755; Aug. 2, 1993, 5-191224**
**Int. Cl.[6] F21V** *7/02*; **G03B** *21/28*
**U.S. Cl. 353—98** **5 Claims**




**3**. A projection type liquid crystal display comprising:

a light source for emitting light,

a reflector for focusing and emitting the light from the light source onto a liquid crystal display element which is illuminated by the light from said light source,

a projection lens for enlarging and projecting an image on said liquid crystal display element onto a screen, and

a dichroic reflecting mirror which is formed in said light source by a dichroic film which transmits thermic rays and reflects visible rays.

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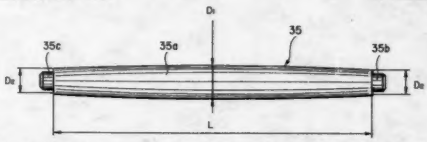
## 5,491,526
## INSTANT CAMERA AND MANUFACTURING METHOD OF THE SAME

**Mitsuru Shimizu, Saitama, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan**

**Filed Jun. 22, 1994, Ser. No. 263,839**
**Claims priority, application Japan, Jun. 24, 1993, 5-153613**
**Int. Cl.[6] G03B** *17/50*
**U.S. Cl. 354—86** **16 Claims**




**1**. An instant camera for use with a film unit in which a solution pod contains processing solution, said camera having first and second rotatable spreading rollers for applying pressure to said film unit, said spreading rollers rotated to squeeze said pod, and exiting said film unit from a camera body while spreading said solution, said instant camera comprising:

at least said first spreading roller shaped to have convexity at a center like a barrel which meets

$$0.5\ \delta \leqq D_1 - D_2 \leqq 4\ \delta$$

where said $D_1$ is a diameter of a center of said first spreading roller, said $D_2$ is a diameter of ends of said first spreading roller, and said **6** is an amount at which said center of said first spreading roller is flexed relative to said ends and which meets

$$\delta = WL^3/(3\pi D_2^4 \cdot E)$$

where said E is Young's modulus of material of said first spreading roller, said L is a length of said first spreading roller, and said W is load applied between said first and second spreading rollers; and

at least said first spreading roller constructed from said material having said Young's modulus E meeting

$$E \geqq WL^3/(3\pi D_2^4 \cdot t)$$

where said t is thickness of said film unit.

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## 5,491,527
## TAKING OPTICAL SYSTEM CAPABLE OF TRIMMING PHOTOGRAPHY

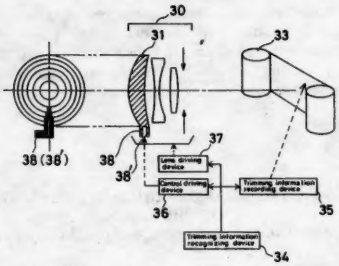
**Minoru Oshikiri, and Juro Kikuchi, both of Tokyo, Japan, assignors to Olympus Optical Co., Ltd., Tokyo, Japan**

**Division of Ser. No. 118,242, Sep. 9, 1993, Pat. No. 5,406,344.**
**This application Dec. 29, 1994, Ser. No. 366,112**
**Claims priority, application Japan, Sep. 10, 1992, 4-241737; Sep. 10, 1992, 4-241738**
**Int. Cl.[6] G03B** *1/18*
**U.S. Cl. 354—195.12** **2 Claims**

**1**. A trimming camera having a taking lens and capable of trimming photography, said trimming camera comprising:

said taking lens including an optical element at least one of constituent elements of which is variable;

means for recognizing trimming information including trimming magnification; and




control driving means for controlling at least one of surface configuration, refractive index and refractive index distribution of said optical element so that axial spherical aberration of said taking lens decreases as the trimming magnification recognized by said trimming information recognizing means increases.

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**5,491,528**

**REAL IMAGE MODE FINDER OPTICAL SYSTEM HAVING AN OBJECTIVE LENS INTEGRATED AS A PRISM WITH A REFLECTIVE SURFACE**

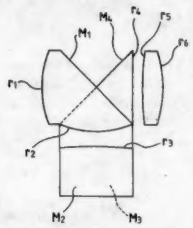
**Hideyasu Takato, and Seiji Shimizu, both of Hachioji, Japan, assignors to Olympus Optical Co., Ltd., Tokyo, Japan**

**Filed Apr. 13, 1994, Ser. No. 226,850**

**Claims priority, application Japan, Apr. 14, 1993, 5-087503**

**Int. Cl.[6] G03B** *13/08*

**U.S. Cl. 354—225** **6 Claims**




1. A real image mode finder optical system comprising, in order from an object side thereof:

an objective lens;

an image inverting optical member for erecting an object image formed by said objective lens; and

an eyepiece for observing said object image;

wherein said objective lens has a reflecting surface and satisfies a condition:

$$0.1<D/f<0.4$$

where D is a distance between an exit surface of said objective lens and an entrance surface of said image inverting optical member and f is a focal length of said objective lens.

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**5,491,529**

**CAMERA WITH INFRARED BEAM TYPE REMOTE CONTROLLER**

**Fumio Iwai; Katsuji Ozawa, and Michihiro Shiina, all of Omiya, Japan, assignors to Fuji Photo Optical Co., Ltd., Saitama, Japan**

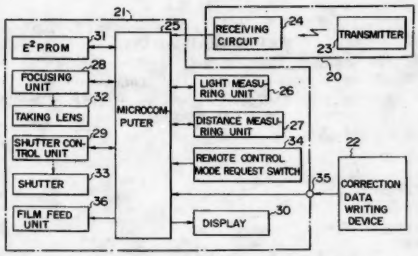
**Filed Oct. 7, 1993, Ser. No. 132,860**

**Claims priority, application Japan, Jan. 16, 1992, 4-304750**

**Int. Cl.[6] G03B** *17/38*

**U.S. Cl. 354—266** **21 Claims**

8. A distance determination system for use in a camera having a remote control device, the system comprising:




a transmitter for transmitting an infrared remote control signal including at least one ranging signal composed of a sequence of pulses of different widths;

a receiver for receiving the remote control signal including the at least one ranging signal; and

recognition means, responsive to the receiver, for determining actual distance from the transmitter to the receiver as a function of that portion of the ranging signal actually received.

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**5,491,530**

**PROCESSING OF PHOTOGRAPHIC FILM**

**Anthony Earle, Harrow; Christopher M. Graebe, Berkhamstead; Edward C. T. S. Glover, London; David A. Skye, Harpenden; Nicholas J. Taylor, Harrow Weald, and Paul C. Ward, Oxhey, all of, England, assignors to Eastman Kodak Company, Rochester, N.Y.**

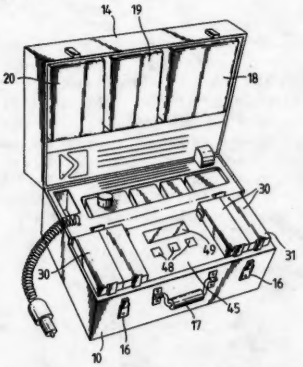
**PCT No. PCT/EP92/02027, § 371 Date Apr. 23, 1994, § 102(e) Date Apr. 23, 1994, PCT Pub. No. WO93/04404, PCT Pub. Date Mar. 4, 1993**

**PCT Filed Aug. 17, 1992, Ser. No. 196,088**

**Claims priority, application United Kingdom, Aug. 20, 1991, 9117940**

**Int. Cl.[6] G03D** *17/00*

**U.S. Cl. 354—313** **8 Claims**




1. A portable film processing unit comprising:

loading means for receiving a film cassette containing undeveloped film;

at least one processing chamber;

at least one receptacle means for containing processing fluids;

coupling means for coupling each receptacle means to each processing chamber;

valve means for selectively permitting flow of processing fluids between each receptacle means and a respective one of the processing chambers;

removal means for removing the film from its cassette and winding it onto a spiral type holder located in a processing

chamber, the loading means, the removal means, and the processing chambers being housed in light-tight conditions; and

pump means to facilitate the flow of processing fluid from the processing chamber to respective receptacle means, the arrangement being such that the processing fluids can be dispensed from the receptacle means to a selected one of the processing chambers to perform a processing operation on the film therein and, on completion of that processing operation, the fluid can be returned under the influence of the pump means to its respective receptacle means.

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**5,491,531**

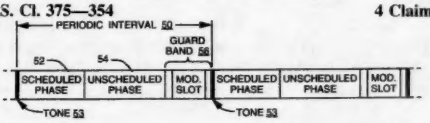
## MEDIA ACCESS CONTROLLER WITH A SHARED CLASS MESSAGE DELIVERY CAPABILITY

**Shawn L. Adams, Washtenaw County; Timothy Siorek, Jackson County, and Mark A. Lucak, Washtenaw County, all of Mich., assignors to Allen-Bradley Company, Inc., Milwaukee, Wis.**

**Filed Apr. 28, 1993, Ser. No. 54,703**

**Int. Cl.[6] H04L** *7/00;* **H04J** *3/16;3/24*

**U.S. Cl. 375—354** **4 Claims**




1. In a digital communication network of the type in which (a) activity on the digital communication network is divided into periodic time intervals each of which being subdivided into a first phase and a second phase, (b) protocol for operation of the digital communication network guarantees that all active subscribers to the network are granted access to the network during every repetition of the first phase, (c) each first phase transmission is limited to a predetermined maximum time interval, and (d) active subscribers to the network are selectively granted access to the network during the second phase according to a predetermined selection criteria, an improved media access controller comprising:

an interface for connecting to a device that produces data for transmission over the digital communication network;

a first memory connected to said interface for storing a first restricted class of data supplied by the device, the first restricted class of data being restricted to transmission during the first phase only;

a second memory connected to said interface for storing a shared class of data supplied by the device which shared class of data may be transmitted over the digital communication network during the first and second phases;

a transmitter coupling said first and second memories to the network for the transmission of data; and

a control circuit which transfers data from said first and second memories to said transmitter, data being transferred from said first memory when the media access controller has access to the network during one of said first phases, and shared class data being transferred from said second memory at the earliest occurrence of either (1) an opportunity to include the shared class data from said second memory in one of said first phases without exceeding said predetermined maximum transmission time interval after having transmitted said first restricted class of data, or (2) a grant of access to the network is obtained by the media access controller during one of said second phases.

**5,491,532**

## CAMERA WITH DEVICE FOR DETECTING LINE OF SIGHT

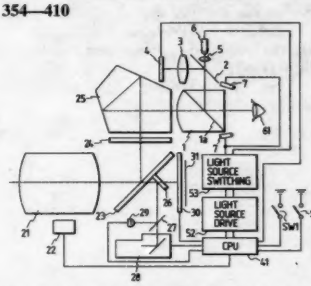
**Fumio Suzuki, and Shigemasa Sato, both of Yokohama, Japan, assignors to Nikon Corporation, Tokyo, Japan**

**Continuation of Ser. No. 115,567, Sep. 3, 1993, abandoned. This application Sep. 19, 1994, Ser. No. 305,981**

**Claims priority, application Japan, Sep. 14, 1992, 4-245194**

**Int. Cl.[6] G03B** *13/02*

**U.S. Cl. 354—410** **24 Claims**




1. A camera with a sight line detecting device provided with illumination means for illuminating an eye of a photographer, and a photoelectric conversion device which photoelectrically converts the light reflected from said eye illuminated by said illumination means, the sight line detecting device detecting a sight line of the photographer based on output from said photoelectric conversion device;

wherein said illumination means includes a first light source for detecting a corneal reflected image of said eye; and

a second light source for detecting the boundary between the pupil and the iris of said eye, or the boundary between the iris and the white of said eye with a smaller intensity of a corneal reflected light than that by the first light source.

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**5,491,533**

## ELECTRONIC FLASH CONTROL SYSTEM AND METHOD FOR HIGH-SPEED FLASHING

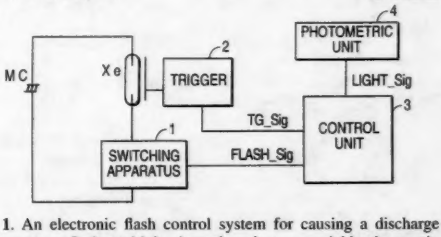
**Hiroshi Sakamoto, Kawasaki, Japan, assignor to Nikon Corporation, Tokyo, Japan**

**Filed Jun. 29, 1994, Ser. No. 267,400**

**Claims priority, application Japan, Jun. 29, 1993, 5-158707**

**Int. Cl.[6] G03B** *7/00*

**U.S. Cl. 354—416** **12 Claims**




1. An electronic flash control system for causing a discharge element to flash multiple times based on a variable duty ratio during an exposure cycle of a camera, the control system comprising:

a main capacitor;

a discharge loop associated with the discharge element;

a photometric unit for outputting a signal corresponding to the quantity of light emitted from the discharge element and received by the photometric unit; and

a switching apparatus connected to said discharge loop and including

a control unit adapted to output a control signal based on the duty ratio which causes the discharge element to turn on

and off, said control system varying the duty ratio based on said photometric unit signal.

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**5,491,534**

**EXPOSURE APPARATUS AND MICRODEVICE MANUFACTURING METHOD USING THE SAME**

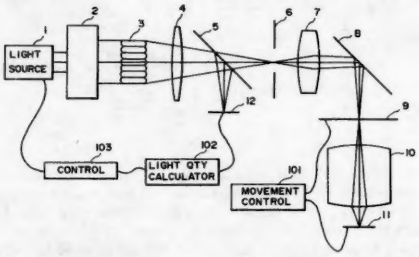
**Takahisa Shiozawa, Utsunomiya, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan**

**Filed Jun. 24, 1994, Ser. No. 265,140**

**Claims priority, application Japan, Jun. 29, 1993, 5-159054; Jun. 1, 1994, 6-119971**

**Int. Cl.[6] G01D** *9/42;* **G03B** *27/72*

**U.S. Cl. 355—69** **33 Claims**




**1**. An exposure apparatus for exposing a substrate with pulses of light supplied sequentially, said apparatus comprising:

means for detecting the light quantity of a pulse; and

means for controlling the timing of emission of a pulse to be emitted, on the basis of the light quantity provided by at least one pulse preceding the pulse to be emitted.

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**5,491,535**

**CONTROL APPARTUS OF COPYING MACHINE WITH IMPROVED COMMUNICATION FUNCTION FOR CENTRALIZED CONTROL**

**Sumiaki Hirata; Kazunobu Maekawa, and Kenzo Nagata, all of Aichi, Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan**

**Continuation of Ser. No. 682,107, Apr. 8, 1991, abandoned. This application Jan. 28, 1994, Ser. No. 188,121**

**Claims priority, application Japan, Apr. 10, 1990, 2-95268; Apr. 10, 1990, 2-95269; Apr. 10, 1990, 2-95270; Jun. 6, 1990, 2-148168; Jun. 29, 1990, 2-173579; Jul. 18, 1990, 2-190101; Aug. 1, 1990, 2-204423**

**Int. Cl.[6] G03G** *21/00;* **H04M** *11/00*

**U.S. Cl. 355—204** **22 Claims**

**1**. A control apparatus collecting data related to a copying machine and communicating with a centralized control unit on the basis of the collected data, comprising:

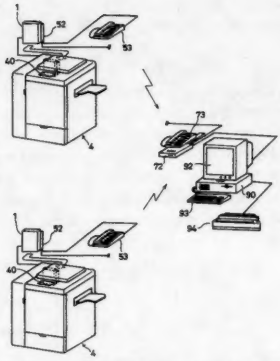
communication means for calling said centralized control unit;

first control means for operating said communication means when a predetermined transmission condition is satisfied, said predetermined transmission condition including one with high priority and one with low priority;

determining means for determining that connection with said centralized control unit can not be made in spite of activation of said communication means;

differentiating means for differentiating priority of said predetermined transmission condition;

setting means for setting a retransmission time in response to outputs of said determination means and differentiating means, said setting means, when the priority of the predetermined transmission condition is low, setting a retransmission time in transmission permitting time periods excluding transmission forbidding time periods which are provided at predetermined time intervals, each of said transmission forbidding



time periods being longer than a time period required for communication with said centralized control unit;

timer means for counting the present time; and

second control means for operating said communication means again when the counted present time comes to the retransmission time.

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**5,491,536**

**IMAGE-QUALITY STABILIZER HAVING ADJUSTABLE TIME INTERVAL BETWEEN FEEDBACK CONTROL**

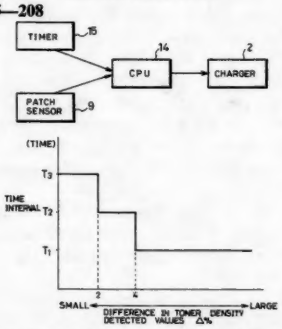
**Tamaki Mashiba, Nara, and Akihiko Taniguchi, Yamatokoriyama, both of, Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan**

**Filed Sep. 28, 1994, Ser. No. 313,847**

**Claims priority, application Japan, Jan. 4, 1993, 5-248270**

**Int. Cl.[6] G03G** *21/00*

**U.S. Cl. 355—208** **8 Claims**




**1**. An image quality stabilizer for use in an electrophotographic printing machine, comprising:

adhering toner amount detecting means for detecting an amount of adhering toner of a reference toner image formed on a photoreceptor;

time measuring means for measuring a set time interval between feedback controls;

time interval altering means for altering the set time interval based on a difference between a detected adhering toner amount and a predetermined reference toner amount at a start of every feedback control; and

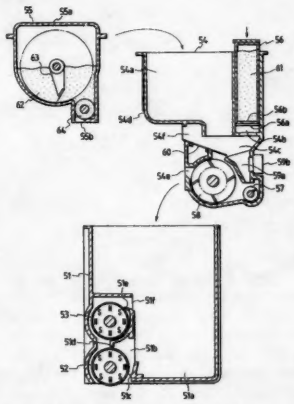
control means for executing a feedback control on an output from charger means based on an altered time interval, so that the detected adhering toner amount becomes equal to the predetermined reference toner amount.

## 5,491,537

### DEVELOPING APPARATUS HAVING DEVELOPING AGENT ACCOMMODATING CARTRIDGE AND CARTRIDGE FOR ACCOMMODATING DEVELOPING AGENT FOR USE IN DEVELOPING APPARATUS

Mitsuo Suzuki; Isamu Terashima, and Katsumi Kumada, all of Hitachi, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Sep. 21, 1993, Ser. No. 124,393
Claims priority, application Japan, Sep. 22, 1992, 4-252887
Int. Cl.[6] G03G *15/06*
U.S. Cl. 355—245 13 Claims



1. A developing apparatus having a developing agent accommodating cartridge member, wherein the developing apparatus comprises:

a developing agent supplying roller;

a toner accommodating cartridge member for supplementing the toners;

a developing magnet roller for brushing and sliding an electrostatic latent image formation surface;

a developing agent containing member for receiving said developing agent supplying roller, said toner accommodating cartridge member and said developing magnet roller; and

a driving means for driving said developing agent supplying roller and said developing magnet roller; wherein

said developing agent containing member comprises said developing agent accommodating cartridge member and a developing means frame member;

said developing agent accommodating cartridge member comprises:

a toner accommodating cartridge member receiving space for fitting said toner accommodating cartridge member,

a developing agent accommodating space for accommodating the developing agent,

a developing agent sending-out port for sending out the developing agent to said developing magnet roller, and

a developing agent recovering port for recovering the developing agent to said developing agent accommodating space,

said developing means frame member comprises:

a developing agent cartridge member receiving space for supporting said developing magnet roller and for fitting said developing agent accommodating cartridge member,

a developing agent receiving port for supplying the developing agent by receiving the developing agent sending-out port of said developing agent accommodating cartridge member, and

a developing agent discharging port for sending out the developing agent to said developing agent recovering port of said developing agent accommodating cartridge member, and

said driving means comprises:

a developing agent recovery controlling means, and said developing agent recovery controlling means drives said developing magnet roller at the condition when the rotation of said developing agent supplying roller is stopped.

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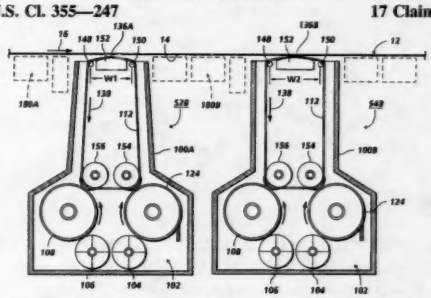
## 5,491,538

### DEVELOPMENT APPARATUS HAVING AN ADJUSTABLE WIDTH DEVELOPMENT NIP

Mark A. Gwaltney, Fairport, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Jul. 5, 1994, Ser. No. 270,980
Int. Cl.[6] G03G *15/08*
U.S. Cl. 355—247 17 Claims



1. In a color electrostatographic reproduction machine having an image bearing member, a development system for developing latent images of color components of a color original image recorded on the image bearing member, the development system including:

(a) a first development unit including a first housing storing a developer material containing toner of a first color for developing a first latent image of a first color component, said first development unit having a belt type first donor member mounted within said first housing and forming a first development nip with the image bearing member, said first development nip having a first width thereto; and

(b) a second development unit including a second housing storing a developer material containing toner of a second color for developing a second latent image of a second color component, said second development unit having a belt type second donor member mounted within said second housing and forming a second development nip with the image bearing member, said second development nip having a second width thereto greater than said first width of said first development nip, for enabling uniform quality development from both said first and said second development nips.

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## 5,491,539

### PROCESS CARTRIDGE AND IMAGE FORMING APPARATUS ADAPTED FOR THE MOUNTING OF THE SAME THERETO WITH ELASTIC MEMBER DISPOSED THEREBETWEEN

Takeo Shoji, Yokohama, and Yasushi Shimizu, Tokyo, both of, Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 9, 1993, Ser. No. 163,707
Claims priority, application Japan, Dec. 14, 1992, 4-352906; Jan. 8, 1993, 5-253056
Int. Cl.[6] G03G *15/00*
U.S. Cl. 355—200 22 Claims

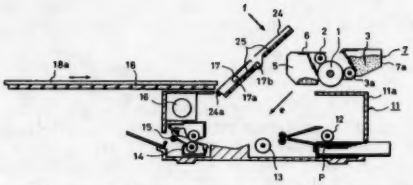
11. A process cartridge detachably mountable to a main assembly of an image forming apparatus, said process cartridge comprising:

a frame comprising an upper surface;

an electrophotographic photosensitive member;

process means which acts on said electrophotographic photosensitive member; and

an elastic pressing member for suppressing vibration and provided on said upper surface of said frame in such a manner



that it is sandwiched between said image forming apparatus body and said upper surface of said frame when said process cartridge is mounted to said image forming apparatus.

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## 5,491,540

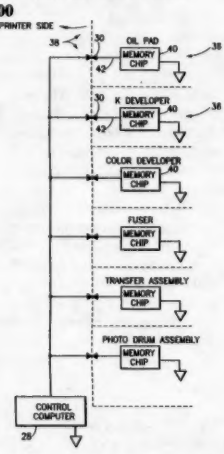
## REPLACEMENT PART WITH INTEGRAL MEMORY FOR USAGE AND CALIBRATION DATA

**B. Mark Hirst, Boise, Id., assignor to Hewlett-Packard Company, Palo Alto, Calif.**

**Filed Dec. 22, 1994, Ser. No. 363,188**

**Int. Cl.[6] G03G** *15/00*

**U.S. Cl. 355—200** **7 Claims**




1. Apparatus for making marks on media sheets, said apparatus adapted to receive replaceable parts that are subject to wear or include a consumable that is employed during operation of said apparatus, said apparatus comprising:

processor means for controlling said apparatus;

a receptacle for receiving a replaceable part;

first connector means associated with said one receptacle and coupled to said processor means; and

a replaceable part, juxtaposed to said receptacle and including a second connector means that mates with said first connector means, said replaceable part including a serial access memory that is connected to said second connector means by only a single wire, said processor means enabled thereby to both read and write data from and to said serial access memory, said serial access memory storing data at least indicative of usage of said replaceable part.

## 5,491,541

## DEVELOPING APPARATUS HAVING ADJACENT SIMILAR MAGNETIC POLES

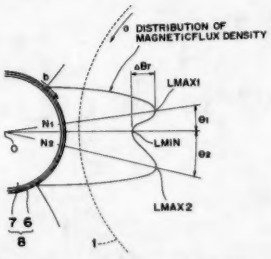
**Tomoaki Yokoyama, Aichi, and Makoto Takase, Toyokawa, both of, Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan**

**Filed Nov. 10, 1993, Ser. No. 149,793**

**Claims priority, application Japan, Nov. 12, 1992, 4-302237; Nov. 12, 1992, 4-302290; Nov. 12, 1992, 4-302330**

**Int. Cl.[6] G03G** *15/09*

**U.S. Cl. 355—251** **5 Claims**




1. A developing apparatus comprising a stationary magnetic member having a plurality of magnetic poles extending in a direction axially of the magnetic member, and a non-magnetic rotatable sleeve enclosing the magnetic member therein, wherein a developer material is retained upon a periphery of the sleeve by effect of a magnetic force of attraction generated by the magnetic member during a rotation of the sleeve so as to be brought into contact with an electrostatic latent bearing member, two of the magnetic poles of the magnetic member which are positioned so as to confront a nipping region between the sleeve and a photoreceptor in neighboring relation with each other are of same polarity, and produce a distribution of magnetic flux density having a local minimum point, a first local maximum point located upstream of the local minimum point with respect to rotation of the sleeve, and a second local maximum point located downstream of the local minimum point with respect to the rotation of the sleeve, a central angle θ1 between a line extending from a center of the magnetic member to the first local maximum point and a line extending from the center of the magnetic member to the local minimum point being smaller than a central angle θ2 between the line extending from the center of the magnetic member to the local minimum point and a line extending from the center of the magnetic member to the second local maximum point; and the developer materials retained by an attraction force generated by the neighboring magnetic poles of same polarity are kept in contact with the electrostatic latent image bearing member.

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## 5,491,542

## DEVELOPER SUPPLYING CONTAINER AND ASSEMBLING METHOD THEREOF

**Toshiaki Nagashima, Yokohama; Kunihiko Kitayama, Kawasaki, and Kiyoshi Oyama, Tokyo, all of, Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan**

**Filed Jun. 6, 1994, Ser. No. 254,760**

**Claims priority, application Japan, Jun. 10, 1993, 5-163813; May 20, 1994, 6-106814**

**Int. Cl.[6] G03G** *15/06*

**U.S. Cl. 355—260** **16 Claims**

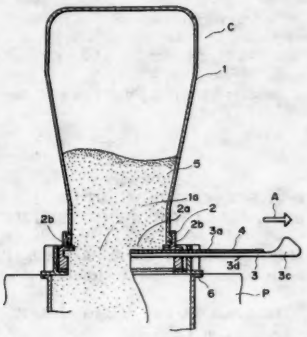
1. A developer supply container comprising:

a developer containing portion having an opening for supplying a developer therefrom;

shutter means for closing and opening the opening; and

a guiding member for defining the opening and for guiding opening and closing motion of said shutter means,

wherein said shutter means has a shutter and an elastic seal provided on said shutter and slidable on said guiding member.




5,491,543

**TRANSFER ROLLER CONTROLLED TO POSITION THE PAPER IN REGISTRATION WITH THE TONER IMAGE**

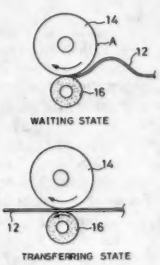
**Tadashi Renbutsu, Gifu, Japan, assignor to Sanyo Electric Co., Ltd., Moriguchi, Japan**

**Filed Apr. 21, 1994, Ser. No. 231,198**

**Claims priority, application Japan, Apr. 21, 1993, 5-118992**

**Int. Cl.[6] G03G** *15/14*

**U.S. Cl. 355—271** **15 Claims**




1. An image forming apparatus, comprising:

an image forming member;

a transfer roller for transferring a toner image formed on said image forming member onto a paper, a leading end portion of the paper being brought into contact with a contact point between said image forming member and said transfer roller and being bent after being fed, at least when in a mis-registration state and

control means for controlling rotation of said transfer roller independently from operation of said image forming member and stopping the rotation of said transfer roller before said toner image is transferred to said paper when the paper leading end portion is bent.

5,491,544

**MOUNTING MECHANISM FOR A ROLLER TRANSFER ASSEMBLY**

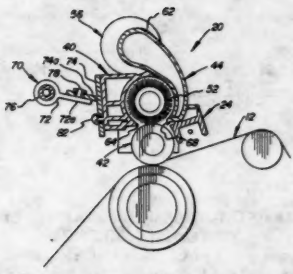
**Michael Kenin; Steven L. Moore; Larry T. Schlitzer, and Michael J. Wendell, all of Eastman Kodak Company, Rochester, N.Y. 14650**

**Filed Oct. 28, 1994, Ser. No. 330,491**

**Int. Cl.[6] G03G** *15/14;15/16*

**U.S. Cl. 355—271** **8 Claims**

1. In an electrostatographic reproduction apparatus having a transfer assembly, of compact configuration, including an electrically biased transfer roller for effecting transfer of a pigmented marking particle image from a dielectric support to a receiver




member, a mechanism for mounting said transfer assembly, said mechanism comprising:

means for supporting said transfer assembly within said reproduction apparatus; and

means for connecting said transfer assembly supporting means to said transfer assembly such that said transfer roller of said transfer assembly is castered and gimbaled.

5,491,545

**ELECTROPHOTOGRAPHIC PRINTER FOR REEL PAPER HAVING A THERMAL PRINT FIXING STATION**

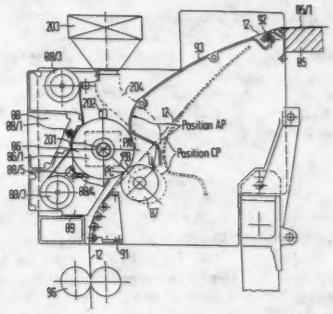
**Walter Kopp, Taufkirchen, and Josef Windele, Puchheim, both of, Germany, assignors to Siemens Aktiengesellschaft, Munich, Germany**

**Continuation of Ser. No. 859,527, Jun. 10, 1992, Pat. No. 5,428,433. This application Aug. 1, 1994, Ser. No. 282,498**

**Claims priority, application European Pat. Off., Dec. 13, 1989, 89123027**

**Int. Cl.[6] G03G** *15/20*

**U.S. Cl. 355—290** **19 Claims**




1. An electrophotographic printer system for reel paper, comprising:

reel paper having a front side and a rear side, the rear side having a fixed printed image thereon; a print transfer station with integrated paper transport device for transferring onto the front side of the reel paper a toner image which is produced on an intermediate carrier and inked,

an electrothermal fixing station, which is arranged downstream of the print transfer station in a transport direction of the paper, for the toner image on the front side of the reel paper with

an electrically heated fixing roller driven by an electric motor

a feed roller which is pivotable between at least one position against the fixing roller and another position away from the fixing roller in a fixing area and

an unheated paper guide saddle which is pivotable between at least one position against the fixing roller and another position away from the fixing roller and by means of which the reel paper is guided around the fixing roller at a wrap-

ping angle which is predetermined by a pivot position of the paper guide saddle for the purpose of preheating before actual fixing, and

a paper brake which is mounted upstream of the fixing station in the transport direction of the paper for making the reel paper taut, as required, between the fixing area and the paper guide saddle.

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**5,491,546**

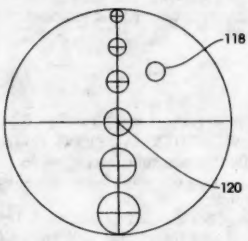
**LASER ASSISTED TELESCOPIC TARGET SIGHTING SYSTEM AND METHOD**

**Rick R. Wascher, P.O. Box 198468, Nashville, Tenn. 37219; Ray Fairbanks, Jr., 1806 E. Main St., Murfreesboro, Tenn. 37130, and Roy L. Neuhauser, III, P.O. Box 10613, Knoxville, Tenn. 37939**

**Filed Feb. 17, 1994, Ser. No. 197,649**

**Int. Cl.[6] G01C** *3/08;3/10;* **F41G** *1/38;1/34*

**U.S. Cl. 356—4.03** **22 Claims**




1. A laser assisted telescopic targeting device, comprising:

a shooting scope;

laser means, positioned substantially parallel to the shooting scope for projecting a beam of laser light toward a target enabling a spot of laser light to appear thereon and remain within a field of view associated with the shooting scope; and

sizing means for determining the approximate size of the spot of laser light: as viewed through the shooting scope and projected on the target by the laser means enabling a user to determine the relative distance the spot of laser light is from the laser means.

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**5,491,547**

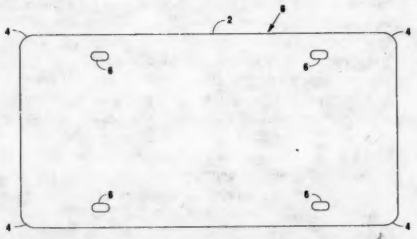
**METHOD AND APPARATUS FOR INHIBITING LASER DETECTION**

**Mark F. Jones, and Henry Devilliers, both of San Antonio, Tex., assignors to Laser Stealth Technology L.L.C., San Antonio, Tex.**

**Filed Jun. 3, 1994, Ser. No. 253,806**

**Int. Cl.[6] G09F** *7/00;* **G01P** *3/36*

**U.S. Cl. 356—28** **17 Claims**



1. Method of inhibiting laser detection comprising the steps of:

a. altering light transmission properties of an acrylic lens panel, said acrylic lens panel suitable for placement over a vehicular license plate wherein altering light transmission properties of said acrylic lens panel comprises the steps of:

i. forming said acrylic lens panel;

ii. adapting said acrylic lens panel for placement over said vehicular license plate;

iii. coating said acrylic lens panel with a filtering treatment.

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**5,491,548**

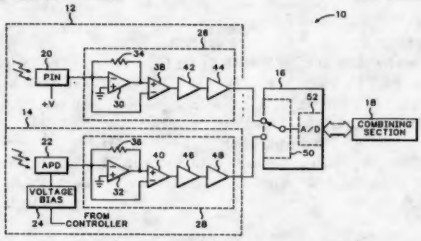
**OPTICAL SIGNAL MEASUREMENT INSTRUMENT AND WIDE DYNAMIC RANGE OPTICAL RECEIVER FOR USE THEREIN**

**Florian G. Bell; William A. Trent, and Alexander R. Lopez, all of Bend, Oreg., assignors to Tektronix, Inc., Wilsonville, Oreg.**

**Filed Mar. 18, 1994, Ser. No. 210,820**

**Int. Cl.[6] G01C** *19/64*

**U.S. Cl. 356—73.1** **180 Claims**




1. A wide dynamic range optical receiver comprising:

a low sensitivity signal channel for converting a first portion of an optical input signal having a first optical power level being ten percent or less of the optical power of the optical input signal into at least one voltage signal representative of the first portion of the optical input signal;

a high sensitivity signal channel for converting a second portion of the optical input signal having a second optical power level being fifty percent or more of the optical power of the optical input signal into at least one voltage signal representative of the second portion of the optical input signal;

means for converting the voltage signals from the respective low and high sensitivity signal channels into digital values representative of the various portions of the optical input signal; and

means for combining the digital values representative of the various portions of the optical input signal to produce a composite digital output representative of the optical input signal.

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**5,491,549**

**APPARATUS FOR ACQUIRING PENDULUM OSCILLATIONS OF CRANE LOADS USING MEASUREMENT TECHNIQUES**

**Wolfgang Wichner, Wendelstein, and Ludwig Carbon, Erlangen, both of, Germany, assignors to Siemens Aktiengesellschaft, Munich, Germany**

**Filed Nov. 3, 1993, Ser. No. 147,244**

**Claims priority, application Germany, Nov. 3, 1992, 42 37 096.5; European Pat. Off., Jun. 3, 1993, 93108948**

**Int. Cl.[6] G01B** *11/26;* **B66C** *13/06*

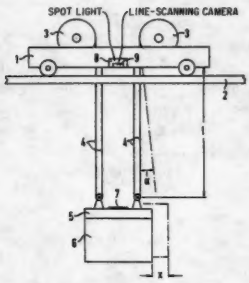
**U.S. Cl. 356—141.2** **21 Claims**

1. An apparatus for acquiring pendulum oscillations in a crane bearing a load, comprising:

a) a first reflective marking being disposed in an area of the load;

b) a light being directed at said first reflective marking and being mounted on the crane;

c) a line-scanning camera being mounted on the crane, being directed at said first reflective marking, and having a first image-sensing linear array which is aligned longitudinally to a




direction of swing (x), wherein said first image-sensing linear array outputs a signal indicative of light reflected by said first reflective marking; and

d) a first evaluation unit being coupled downstream from the line-scanning camera, and determining positional data pertaining to the load from said signal output by the first image-sensing linear array.

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**5,491,550**

## INTERFERENCE METHODS AND INTERFERENCE MICROSCOPES FOR MEASURING ENERGY PATH LENGTH DIFFERENCES, PATH LENGTH BETWEEN TWO LOCAITONS OR FOR DETERMIING REFRACTIVE INDEX

**Timothy P. Dabbs, West Ryde, Australia, assignor to Commonwealth Scientific and Industrial Research Organization, Campbell, Australia**

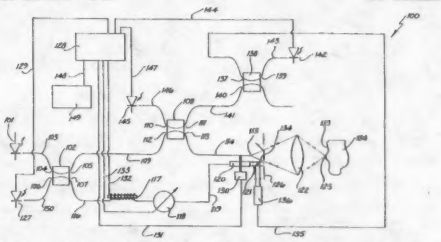
**PCT No. PCT/AU91/00406, § 371 Date Jul. 23, 1993, § 102(e) Date Jul. 23, 1993, PCT Pub. No. WO92/04594, PCT Pub. Date Mar. 19, 1992**

**PCT Filed Aug. 30, 1991, Ser. No. 977,399**

**Claims priority, application Australia, Aug. 31, 1990, PK2088; Feb. 21, 1991, PK4715**

**Int. Cl.[6] G01B** *9/02*

**U.S. Cl. 356—345** **20 Claims**



1. A method for determining the refractive index of an object between two locations in mid object, wherein said object is a partially energy transparent object with a known path length between, first and second locations in said object, by measuring the difference between two energy path lengths, said method comprising:

spatially filtering confocally and coherently directing a portion of an illuminating energy beam from a coherent energy source through a first coherent energy guide to an energy exit port denoted the first exit;

coherently directing a second portion of said illuminating energy beam through a second coherent energy guide to an energy exit port denoted the second exit;

wherein said first and second portions of said illuminating energy beam are at least partly coherent and respect to one another on emerging from said first and second exits respectively;

focussing coherently at least a portion of illuminating energy emerging from said first exit into a first spot intersecting said object;

coherently directing at least a portion of a first coherent signal energy beam resulting from interaction between said illuminating energy beam in said first spot and said object to an interferometer, said first signal beam being coherent with respect to said illuminating energy beam;

focussing coherently at least a portion of illuminating energy emerging from said second exit into a second spot intersecting said object;

coherently directing at least a portion of a second coherent signal energy beam resulting from interaction between said illuminating energy beam in said second spot and said object to said interferometer; said second signal beam being coherent with respect to said illuminating energy beam;

wherein said first spot is at a first location in said object, said second spot is formed by focussing through said object via said first location to a second location in said object;

whereby said first and second signal beams interfere thereby producing an output signal;

calculating from said output signal said energy path length difference between said first energy path from said energy source, through said first energy guide to the intersection of said first spot with said object to said interferometer and said second energy path from said energy source, through said second energy guide to the intersection of said second spot with said object to said interferometer; and

determining the refractive index of said object between said first and second locations in said object by comparing said energy path length difference with said known path length.

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**5,491,551**

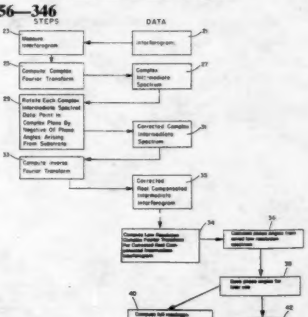
## APPARATUS AND METHOD FOR FTIR SPECTROMETER WITHOUT COMPENSATOR

**David R. Mattson, Madison, Wis., assignor to Analytical Technology, Inc., Boston, Mass.**

**Filed Feb. 22, 1993, Ser. No. 20,523**

**Int. Cl.[6] G01B** *9/02;9/08*

**U.S. Cl. 356—346** **6 Claims**




1. A Fourier transform infrared (IR) spectrometer wherein an IR beam is directed onto a sample for providing either a reflectance or absorbance spectrum of the sample, said spectrometer comprising:

a beamsplitter responsive to an input IR beam incident thereon for substantially equally dividing said input IR beam into a first reflected beam portion and a second transmitted beam portion;

a first reflector aligned with said first reflected beam portion for directing said first reflected beam portion back onto said

beamsplitter, wherein said first reflected beam portion is partially reflected and partially transmitted by said beamsplitter;

a substrate engaging said beamsplitter for providing support and stable positioning for said beamsplitter, wherein said input IR beam is directed through said substrate and onto said beamsplitter;

a second reflector aligned with said second transmitted beam portion for directing said second transmitted beam portion back onto said beamsplitter, wherein said second transmitted beam portion is partially reflected and partially transmitted by said beamsplitter, wherein the first and second beam portions are combined to form an output IR beam and wherein said output IR beam is uncompensated due to a difference in optical paths travelled by said first and second beam portions;

displacement means coupled to one of said first or second reflectors for moving said one of said first or second reflectors for providing an interference pattern in said uncompensated output IR beam, wherein said uncompensated output IR beam is directed onto said sample for obtaining a spectrum of the sample;

signal processing means responsive to said uncompensated output IR beam after transmission through or reflection from said sample in providing an uncompensated sample interferogram for transforming said uncompensated interferogram into a compensated interferogram by Fourier-transforming said uncompensated interferogram from a time domain to frequency domain to provide a complex intermediate spectrum, rotating the complex intermediate spectrum in a complex plane by a negative of a corrected phase angle arising from said substrate to provide a corrected complex intermediate spectrum, inverse Fourier transforming said corrected complex intermediate spectrum to form a corrected real compensated intermediate interferogram, and Fourier transforming the corrected real compensated intermediate interferogram to correct for small phase errors in providing a final spectrum.

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**5,491,552**

## OPTICAL INTERFEROMETER EMPLOYING MUTUALLY COHERENT LIGHT SOURCE AND AN ARRAY DETECTOR FOR IMAGING IN STRONGLY SCATTERED MEDIA

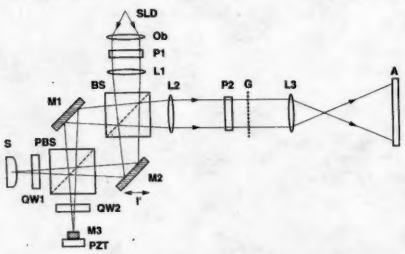
**Alexander Knüttel, Rockville, Md., assignor to Bruker Medizintechnik, Rheinstetten, Germany**

**Filed Mar. 29, 1994, Ser. No. 219,504**

**Claims priority, application Germany, Mar. 29, 1993, 43 10 209.3**

**Int. Cl.[6] G01B *9/02***

**U.S. Cl. 356—360** **24 Claims**




1. An optical imaging apparatus for the investigation of strongly scattering media, having one-dimensional position resolution in a depth direction of a measured object comprising:

a radiation source adapted for the emission of light having a direction and a short coherence length of less than 0.1 mm;

a beam-splitter adapted for splitting the short coherence length light from the radiation source into a first partial beam which is guided in an object arm of the apparatus to be incident on the measured object and a second partial beam which is guided in a reference arm of the apparatus to a reflecting element, the reflecting element being adapted to vibrate with an amplitude of a fraction of a wavelength;

a detector configuration adapted to detect both the second partial beam after reflection from the reflecting element and the first partial beam after reflection from the measured object, the detector configuration having a lateral surface extending transverse to a direction of incidence of the first and the second partial beams which is adapted to record light signals from the two partial beams in a position sensitive and simultaneous fashion; and

optical guiding means for transforming the depth direction of the measured object into a lateral displacement along the lateral surface of the beam from detector by directing the first partial beam from the object arm and the second partial beam from the reference arm into a spatial interference pattern at lateral displacements along the lateral surface of the detector configuration response to laterally spaced virtual light sources from the radiation.

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**5,491,553**

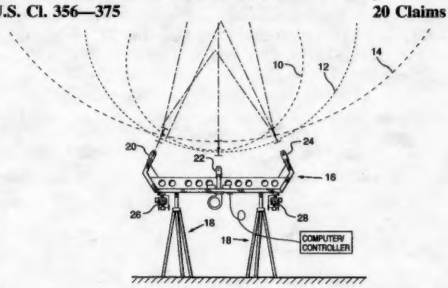
## TRIPLE LASER ROTARY KILN ALIGNMENT SYSTEM

**Walter M. Gebhart, Scarborough, Canada, assignor to Phillips Kiln Service Company of Canada, Ltd., Scarborough, Canada**

**Filed Jun. 1, 1994, Ser. No. 252,021**

**Int. Cl.[6] G01B *11/00***

**U.S. Cl. 356—375** **20 Claims**




1. Apparatus for determining the location of a rotatable body relative to an established datum, comprising survey theodolite means positioned at the established datum for reading upon a distant, portable chassis means located adjacent said rotatable body, the chassis means having at least two reflecting targets, and target adjustment means for aligning the at least two reflecting targets in substantially aligned reflecting relation with the theodolite means to enable line of sight measurement from the established datum to the portable chassis, to thereby accurately determine the location of the chassis means in three dimensions, relative to said datum, said chassis means including at least two distance measuring means for measuring selected distances between said chassis means and said rotatable body.

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**5,491,554**

**Patent Not Issued For This Number**

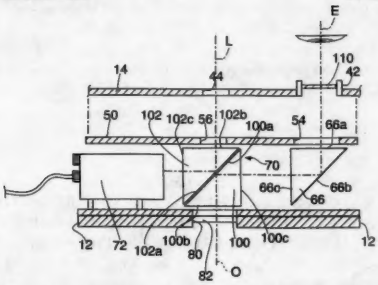
## 5,491,555
## MEASUREMENT REFERENCING AND TRANSFERRING INSTRUMENT

**Michael L. Romine, 314 Karen Ave., Romeoville, Ill. 60441**

**Continuation-in-part of Ser. No. 170,713, Dec. 21, 1993, abandoned. This application Dec. 16, 1994, Ser. No. 357,870**

**Int. Cl.[6] G01B** *11/00*

**U.S. Cl. 356—399** **44 Claims**




**1**. A measurement referencing and transferring method, comprising the steps of:

locating a platform base at a working location;

mounting sighting means having a sighting axis on the platform base;

sighting a first selected point on a first object in a given direction from the platform base by adjusting the position of the platform base relative to the working location thereby directing the sighting axis of the sighting means toward said first object, and aligning said axis to be incident with the first selected point on the first object;

marking a first reference point on a second object in a direction opposite said given direction from the platform base by observing along the aligned sighting axis in the direction away from said first object, and defining the first reference point as that point on the second object with which said sighting axis is incident; and

determining a measurement associated with the first selected point on the first object by referring to the first reference point marked on the second object.

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## 5,491,556
## ANALYTICAL DEVICE WITH VARIABLE ANGLE OF INCIDENCE

**Douglas A. Stewart; Colin H. Maule, both of Cambridge, and James O. Molloy, Newmarket, all of, United Kingdom, assignors to Fisons, plc, United Kingdom**

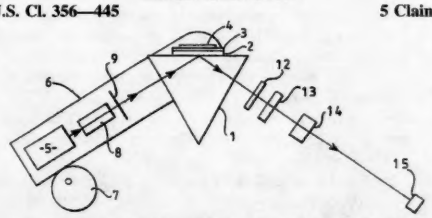
**PCT No. PCT/GB93/00025, § 371 Date Jul. 8, 1994, § 102(e) Date Jul. 8, 1994, PCT Pub. No. WO93/14391, PCT Pub. Date Jul. 22, 1993**

**PCT Filed Jan. 8, 1993, Ser. No. 256,385**

**Claims priority, application United Kingdom, Jan. 11, 1992, 9200564**

**Int. Cl.[6] G01N** *21/55*

**U.S. Cl. 356—445** **5 Claims**




**1**. Apparatus for the determination of a chemical or biochemical species, said apparatus comprising a pivotally-mounted source of monochromatic light, a stationary detector adapted to monitor a characteristic of the light, a resonant optical biosensor disposed in a light path between said source and said detector, means for causing pivotal motion of said source so as to vary the angle of incidence of the light on said sensor, and means for monitoring the instantaneous angle of incidence of the light on said sensor, wherein said resonant optical biosensor is a frustrated total reflection sensor comprising:

a cavity layer of transparent dielectric material of refractive index $n_3$,

a dielectric substrate of refractive index $n_1$, and

interposed between said cavity layer and said substrate, a dielectric spacer layer of refractive index $n_2$, wherein $n_2$ is less than $n_1$ and $n_2$ is less than $n_3$.

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## 5,491,557
## IMAGE FORMING APPARATUS HAVING A MEMORY AND TWO OPERATING MODES, AND METHOD OF USING SAME

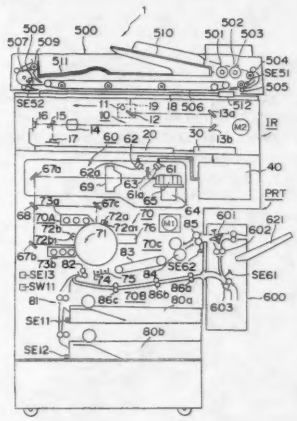
**Akio Nakajima, Toyokawa; Munehiro Nakatani, Toyohashi, and Hideo Muramatsu, Shinshiro, all of, Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan**

**Filed Dec. 22, 1992, Ser. No. 995,057**

**Claims priority, application Japan, Dec. 27, 1991, 3-345945; Dec. 27, 1991, 3-345946**

**Int. Cl.[6] H04N** *1/21*

**U.S. Cl. 358—296** **8 Claims**



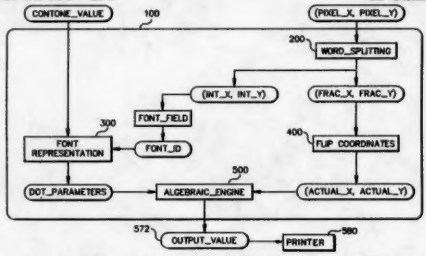

**1**. An image data processing method for an image forming apparatus comprising an image reading unit for reading an image to obtain an image data, an image forming unit for forming an image based on the image data and a storage unit for storing the image data, said method comprising the steps of selectively switching between a first mode, in which an image data reading operation and an image forming operation based on the image data are carried out simultaneously, and a second mode in which, after the image data are temporarily stored in the storage unit, the image forming operation is carried out by reading the image data from the storage unit, the first mode and the second mode are switched over to one another each time a predetermined number of copies has been made.

## 5,491,558

### METHOD AND ASSOCIATED APPARATUS FOR WRITING A HALFTONE DOT HAVING A VARIABLE DENSITY EDGE PROFILE

**John F. Hamilton, Rochester, and Anthony J. Leone, Pittsford, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.**

**Filed Dec. 29, 1992, Ser. No. 998,088**
**Int. Cl.[6] H04N** *1/40;* **G06K** *9/40*
**U.S. Cl. 358—298** **11 Claims**




1. A method for writing a halftone dot having a variable density dot edge profile and associated writing locations and for use with methods that represent a boundary of the halftone dot with an envelope of multiple geometric elements, comprising the steps of:

a) associating density values with the geometric elements as a function of the writing locations;

b) determining a minimum of the associated density values at one of the writing locations;

c) performing a writing with the minimum of the associated density values at the one of the writing locations; and

d) repeating steps a) through c) for each remaining ones of the writing locations associated with the halftone dot.

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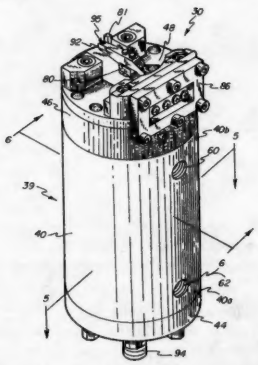
## 5,491,559

### METHOD AND APPARATUS FOR ENGRAVING USING A MAGNETOSTRICTIVE ACTUATOR

**Lester W. Buechler, Dayton, Ohio, assignor to Ohio Electronic Engravers, Inc., Dayton, Ohio**

**Filed Nov. 4, 1994, Ser. No. 334,740**
**Int. Cl.[6] B41C** *102;* **H01L** *41/12*
**U.S. Cl. 358—299** **61 Claims**



1. An engraver for engraving a cylinder having an engraving surface comprising:

an engraving bed;

a headstock and a tailstock mounted on said engraving bed; said headstock and tailstock cooperating to rotatably support said cylinder at an engraving station of said engraver;

an engraving head mounted on said engraving bed at said engraving station to permit the engraving head to engrave said engraving surface;

said engraving head comprising:

a housing;

an engraving stylus for engraving a cylinder positioned at said engraving station of said engraver;

a magnetostrictive member situated in the housing and operatively coupled to said engraving system; and

an energizer for energizing said magnetostrictive member to cause said engraving stylus to oscillate to engrave a predetermined pattern of cells on a surface of said cylinder.

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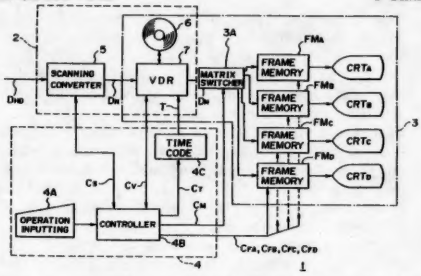
## 5,491,560

### APPARATUS FOR AND METHOD OF RECORDING HIGH RESOLUTION IMAGE, AND APPARATUS FOR AND METHOD OF REPRODUCING THE SAME

**Kazuaki Sugawara, and Hideo Ito, both of Tokyo, Japan, assignors to Pioneer Electronic Corporation, Tokyo, Japan**

**Filed Apr. 27, 1993, Ser. No. 53,459**
**Claims priority, application Japan, Apr. 30, 1992, 4-111450**
**Int. Cl.[6] H04N** *5/91*
**U.S. Cl. 358—342** **8 Claims**




1. An apparatus for recording high resolution image data, which is successively inputted from the external at a predetermined timing, to a recording medium of a random access type, comprising:

a memory for successively storing one high resolution image data by a unit of picture plane at a timing based on a record control signal, which is cyclically inputted, such that said one high resolution image data is held by said memory for one cycle of the record control signal;

a converter coupled to said memory, for dividing said one high resolution image data stored in said memory into N portions corresponding to N divided contiguous areas of one picture plane and entirely converting only one of the N portions to standard image data corresponding to a standard television system and not converting any part of the remaining portions, such that said converted one of the N portions is sequentially shifted each time when said one high resolution image data is held, and that N standard image data, which are successively converted during a time interval corresponding to N cycles of the record control signal, cover one picture plane in a time divisional manner;

a recording device coupled to said converter, for recording the standard image data to the recording medium by a unit of field or frame; and

a control device for generating the record control signal by the cycle which prescribes said predetermined time interval to be enough for said memory, said converter and said recording device to respectively perform storing, converting and recording operations with respect to said one portion of the high resolution image data.

## 5,491,561

## IMAGE PROCESSOR FOR PROCESSING HIGH DEFINITION IMAGE SIGNAL AND STANDARD IMAGE SIGNAL AND DISK APPARATUS THEREFOR

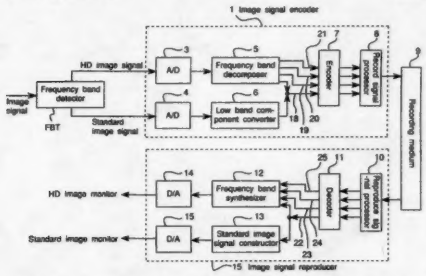
**Hideki Fukuda, Kadoma, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Osaka, Japan**

**Filed Jul. 21, 1993, Ser. No. 94,344**

**Claims priority, application Japan, Jul. 21, 1992, 4-193732**

**Int. Cl.[6] H04N** *5/781;5/76*

**U.S. Cl. 358—342** **5 Claims**




**1**. A disk apparatus for recording a plurality of strings of codes obtained by selectively encoding image signals of different resolutions and for selectively reproducing image signals of different resolutions by reading and decoding said plurality of strings of codes recorded on the disk, said apparatus comprising;

means for selectively inputting an image signal of a first resolution and an image signal of a second resolution, which is lower than said first resolution,

means for decomposing an image signal of said first resolution into a plurality of subband signals by dividing the whole frequency band into a plurality of subbands including a low subband component,

means for converting an image of said second resolution into a low subband signal such that said converted image signal of said second resolution has a band equal to said low subband component of said image signal of said first resolution,

means for selectively encoding in parallel each of said plurality of subband signals, including said lowband signal, for an image signal of first resolution and an image signal of second resolution, and outputting plural strings of codes, said encoding means comprising a single encoder,

means for selectively recording a first string of codes corresponding to a predetermined low frequency subband of said plurality of subbands for said image signal of first resolution and a second string of codes corresponding to said lowband signal for said image signal of second resolution on a first area of the disk and third strings of codes other than said first or second strings of codes on a second area of the disk, said means for recording comprising a first head for recording said first and second strings of codes on said first area, and a second head for recording said third strings of codes on said second area,

means for selectively reading said first and second strings of codes recorded on said first area of the disk as a first component and said third strings of codes recorded on said second area of the disk as a second component, respectively, said means for reading comprising said first head operative for reading said first and second strings of codes, and said second head operative for reading said third strings of codes,

means for selectively activating both first and second heads for reproducing an image signal of first resolution and activating only first head for reproducing an image signal of said second resolution,

means for selectively decoding said first and second components, respectively, and

means for selectively synthesizing said first and second components decoded and, thereby, reproducing image signals corresponding to said image signal of said first resolution and said image signals of said second resolution.

## 5,491,562

## METHOD OF COLOR DATA MAPPING IN COLOR VIDEO SIGNAL RECORDING TO VIDEO DISC

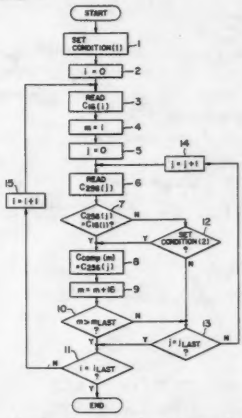
**Isami Kaneda, Yokohama, Japan, assignor to Victor Company of Japan, Ltd., Yokohama, Japan**

**Continuation of Ser. No. 908,256, Jul. 6, 1992, abandoned. This application May 16, 1994, Ser. No. 243,085**

**Claims priority, application Japan, Jul. 5, 1991, 3-192509**

**Int. Cl.[6] H04N** *5/83;9/79*

**U.S. Cl. 358—342** **4 Claims**




**1**. A method of color data mapping in recording a color video signal to a video disc, the method comprising the steps of:

preparing a first color map onto which a predetermined number of first color data are previously mapped and a second color map onto which second color data are previously mapped, the number of the second color data being less than the number of first color data, the first and second color data being expressed by color gradation in different formats;

converting the color gradation format of the first color data into the color gradation format of the second color data by rounding off a quantity of the first color data;

determining differences in the gradation between the second color data and the first color data which is converted into the format of the second color data;

comparing the differences with a reference quantity;

determining similarities in the color gradation of the first color data which is converted to the format of the second color data to the color gradation of the second color data if the differences are smaller than the reference quantity;

preparing a third color map onto which no color data is mapped; and

mapping the first color data onto the third map in order of the determined similarities.

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## 5,491,563

## APPARATUS FOR SCRAMBLING AND UNSCRAMBLING DOCUMENTS

**Yitzchak Pomerantz, Kfar Saba, Israel, assignor to Aliroo Ltd., Kfar Saba, Israel**

**Continuation of Ser. No. 131,326, Oct. 4, 1993, abandoned. This application May 17, 1995, Ser. No. 442,636**

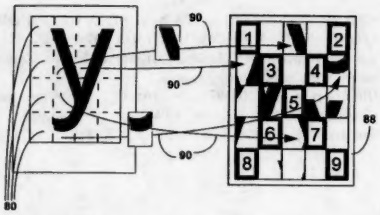
**Claims priority, application Israel, Feb. 4, 1992, 100863; Aug. 2, 1993, 106567**

**Int. Cl.[6] H04N** *1/44*

**U.S. Cl. 358—405** **22 Claims**

**1**. Apparatus for descrambling documents comprising:

a scrambled document signal source, providing signals that represent the contents of a document, receiving a document to be unscrambled and providing output signals representing the contents of the document;




an unscrambler for operating on the output signals to produce modified output signals representing an unscrambled version of the document, the unscrambler employing a system of reference marks, positioned interior of the periphery of at least a portion of the content bearing area of the document, to correct distortion; and

an unscrambled document generator receiving said modified output signals and producing a unscrambled version of the document.

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**5,491,564**

## DATA COMPRESSION METHOD AND APPARATUS FOR BINARY IMAGE USING MARKOV MODEL ENCODING

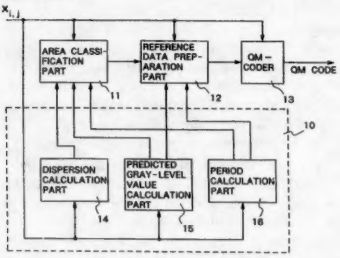
**Takahiro Hongu, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan**

**Filed Feb. 25, 1994, Ser. No. 202,070**

**Claims priority, application Japan, Feb. 26, 1993, 5-037979**

**Int. Cl.[6] H04N** *1/41;1/417;* **G06T** *9/00;9/20*

**U.S. Cl. 358—429** **13 Claims**




**10**. An apparatus for data compression of a binary image, comprising:

image statistic calculation means for calculating an image statistic from an input binary image;

area classification means for performing area classification of said input binary image according to said image statistic and producing an area classification data; and

reference data preparation means for preparing reference data to be used in Markov model encoding; wherein,

said reference data is composed of a first data portion corresponding to said area classification data and a second data portion comprising a data portion other than said first data portion, said second data portion including at least one value which is selected in accordance with said area classification data from (i) a predicted gray-level value of an attentional pixel calculated from encoded pixels, (ii) a pixel value of the encoded pixel having a strong correlation with said attentional pixel, and (iii) a pixel value of a pixel neighboring said attentional pixel.

**5,491,565**

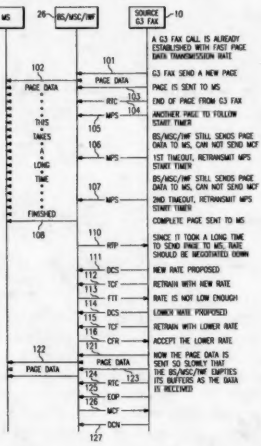
## SYSTEM AND METHOD FOR VARYING THE TRANSMISSION RATE OF FACSIMILE DATA IN A TELECOMMUNICATION SYSTEM

**Hans P. Naper, Montreal, Canada, assignor to Telefonaktiebolaget LM Ericsson, Stockholm, Sweden**

**Filed Dec. 3, 1993, Ser. No. 162,539**

**Int. Cl.[6] H04N** *1/32;1/00;* **H04B** *1/02*

**U.S. Cl. 358—468** **9 Claims**




**1**. A method of communicating facsimile data from a source facsimile apparatus including a modem having a variable transmission rate and connected by a radio network to a destination facsimile apparatus located in a mobile station which is coupled to a base station within said radio network by a radio link, said method comprising the steps of:

receiving facsimile data transmitted at a selected data transmission rate from said source facsimile apparatus at an interworking function located in said radio network, said interworking function including a modem for receiving said facsimile data, and a buffer memory for storing said facsimile data;

storing said facsimile data within said buffer memory;

transmitting said facsimile data from said buffer memory via said radio link to said destination facsimile apparatus within said mobile station;

monitoring the quantity of said facsimile data stored in said buffer memory while said facsimile data is received by said interworking function modem and transmitted from said buffer memory via said radio link;

changing said selected data transmission rate at said source facsimile apparatus in response to a difference between said selected data transmission rate and an actual transmission rate which radio transmission conditions on said radio link permit, as data is transmitted via said radio link to said destination facsimile apparatus within said mobile station;

determining within said interworking function, a preferred selected data transmission rate from said source facsimile apparatus, said preferred selected data transmission rate being approximately equal to the actual transmission rate at which radio transmission conditions on said radio link permit data to be transmitted to said mobile station via said radio link, said determining step further comprising:

sending a first signal from said source facsimile apparatus to said interworking function after each page of facsimile data sent from said source facsimile apparatus;

sending a second signal from said source facsimile apparatus to said interworking function when there exists a subsequent page of facsimile data to be sent from said source facsimile apparatus;

sending a third signal from said interworking function to said source facsimile apparatus in response to said second signal

when said buffer is empty of said facsimile data representing the page previously transmitted;

repetitively initiating a timer in said source facsimile apparatus, for measuring a period of time within which said source facsimile apparatus must receive said third signal before transmitting said subsequent page of facsimile data;

repetitively sending, while facsimile data remains in said buffer memory, said second signal from said source. facsimile apparatus to said interworking function each time said timer expires; and

determining said preferred selected data transmission rate for said source facsimile apparatus in response to a total number of second signals received by said interworking function modem prior to the production of said third signal thereby.

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**5,491,566**

**INTEGRATED INPUT-OUTPUT DEVICE HAVING A READING AND A PRINTING SECTION ON A SINGLE SUBSTRATE**

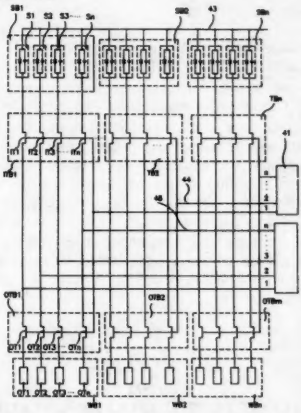
**Tae K. Oh; Kyu N. Choi, and Chang W. Hur, all of Seoul, Rep. of Korea, assignors to Goldstar Co., Ltd., Seoul, Rep. of Korea**

**Filed Nov. 24, 1993, Ser. No. 157,738**

**Claims priority, application Rep. of Korea, Nov. 27, 1992, 22585/1992; Dec. 7, 1992, 23515/1992; Jan. 18, 1993, 566/1993**

**Int. Cl.**[6] **H04N** *1/03;1/032;1/036;* **B41J** *2/335;2/355;2/445*

**U.S. Cl. 358—472** **7 Claims**



1. An integrated input-output device having a reading and a printing section on a single substrate comprising:

a plurality of photoelectric converting circuits respectively arranged in n aligned blocks each including m aligned photoelectric converting elements and adapted to convert optical signals into electrical signals and generate photoelectric charges;

a plurality of first switching circuits respectively arranged in n aligned blocks each including m aligned thin film transistors respectively connected to the photoelectric converting elements of each corresponding one of the photoelectric converting circuits and adapted to selectively output the photoelectric charges from the photoelectric converting circuits;

a plurality of recording circuits respectively arranged in n aligned blocks each including m aligned recording elements and adapted to record data to be printed;

a plurality of second switching circuits respectively arranged in n aligned blocks each including m aligned thin film transistors respectively connected to the recording elements of each corresponding one of the recording circuits and adapted to apply data to be recorded to the recording circuits;

n gate address lines respectively connected in common to gate electrodes of all thin film transistors of the same block-numbered first and second switching circuits;

m data line respectively connected in common to source/drain electrodes of the same numbered thin film transistors of the same block-numbered first and second switching circuits;

a driving circuit adapted to sequentially apply gate pulse signals to the gate address lines; and

a lead-out and recording circuit adapted to lead out the photoelectric charges from the photoelectric converting circuit via the first switching circuits and the data lines and output the data to be recorded in the recording circuits via the data lines and the second switching circuits.

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**5,491,567**

**IMAGE READING APPARATUS**

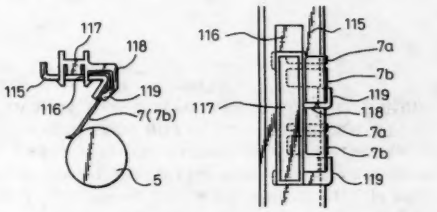
**Shuichi Morikawa, Kanazawa; Masahiko Futatsuka, Ishikawa; Satoshi Ishida, Kanazawa; Yasunori Miyauchi, Kanazawa; Minoru Masuda, Ishikawa, and Makoto Takagawa, Kanazawa, all of, Japan, assignors to PFU Limited, Unoke, and Fujitsu Limited, Kawasaki, both of, Japan**

**Division of Ser. No. 140,161, Mar. 7, 1994, Pat. No. 5,453,852. This application Jun. 5, 1995, Ser. No. 462,291**

**Claims priority, application Japan, Mar. 19, 1992, 4-93746; Apr. 20, 1992, 4-128049; Apr. 20, 1992, 4-128051; Nov. 19, 1992, 4-335574**

**Int. Cl.**[6] **H04N** *1/04;* **B65H** *1/06;3/06;3/34;3/52*

**U.S. Cl. 358—498** **2 Claims**




1. An image reading apparatus having a bottom take-out type automatic paper feeding apparatus which sequentially takes out sheet-like paper (1) stacked on a hopper (3) one by one from the lowermost sheet by separation by paper feed rollers (5) arranged at the front edge side thereof and a separation member (7) coming into contact with said paper feed rollers (5),

characterized in that slid cam mechanisms (**116**, **117**, **119**, etc.) which variably control the contact pressure to the paper feed rollers of the above-described separation member are provided.

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**5,491,568**

**METHOD AND APPARATUS FOR CALIBRATING A DIGITAL COLOR REPRODUCTION APPARATUS**

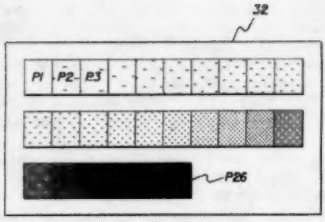
**Shijie Wan, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.**

**Filed Jun. 15, 1994, Ser. No. 260,134**

**Int. Cl.**[6] **G03F** *3/08;* **H04N** *1/46*

**U.S. Cl. 358—518** **5 Claims**

1. A method of calibrating a digital color reproduction apparatus having a scanner for scanning a color image to produce scanner color signals representing said color image, a digital image processor for processing the scanner color signals to produce printer color signals, and a printer responsive to said printer color signals for printing a reproduced color image, the digital image processor including a calibration lookup table that maps the scanner color signals to the printer color signals when the original color image and the reproduced color image are on a same medium, comprising the steps of:




a) determining a relationship between equal printer color signals and averaged scanner color signals;

b) based on the determined relationship, generating a set of color patches on the printer that are uniformly distributed in scanner color signal space;

c) scanning the color patches to generate a lookup table relating printer color signals to scanner color signals; and

d) inverting said lookup table to generate said calibration lookup table.

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**5,491,569**

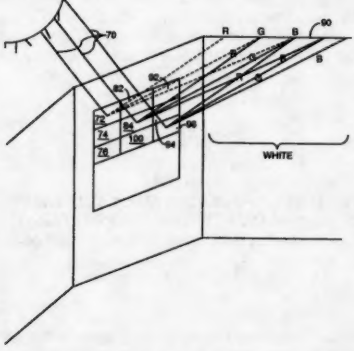
**HIGH EFFICIENCY, BROAD BANDWIDTH, VOLUME HOLOGRAPHIC ELEMENT FOR DIFFRACTION WINDOWS AND METHOD OF MANUFACTURE**

**Juanita R. Riccobono, Nashua, and Jacques E. Ludman, Hollis, both of N.H., assignors to Northeast Photosciences, Hollis, N.H.**

**Filed Jun. 17, 1994, Ser. No. 261,816**

**Int. Cl.**[6] **G02B** *5/32;* **G03H** *1/04;1/30*

**U.S. Cl. 359—3** **6 Claims**




4. An achromatic holographic diffractive window comprising:

at least nine holographic elements, each of said holographic elements capable of continually diffracting solar radiation toward a specific location on a ceiling during the majority of the day; and

said diffracted light mixes at said specific location to form white light.

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**5,491,570**

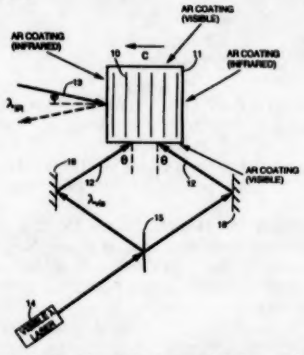
**METHODS AND DEVICES FOR USING PHOTOREFRACTIVE MATERIALS AT INFRARED WAVELENGTHS**

**George A. Rakuljic, Santa Monica, and Victor Leyva, Los Angeles, both of Calif., assignors to Accuwave Corporation, Santa Monica, Calif.**

**Continuation-in-part of Ser. No. 965,746, Oct. 23, 1992, Pat. No. 5,335,098, which is a continuation-in-part of Ser. No. 908,298, Jul. 2, 1992, which is a continuation-in-part of Ser. No. 736,736, Jul. 26, 1991, abandoned. This application Dec. 16, 1992, Ser. No. 991,571**

**Int. Cl.**[6] **G02B** *5/32;* **G03H** *1/18;1/26*

**U.S. Cl. 359—7** **27 Claims**




16. A method of writing reflection mode holographic gratings in a photorefractive material, comprising the steps of:

writing plane holographic gratings in the material Bragg-matched for reflection at a desired infrared wavelength at a specific incidence angle, using shorter wavelength writing beams through a face of the material perpendicular to the grating planes, wherein the writing beams' wavelength is selected to be within the photorefractive sensitivity range of the material and to obtain a Bragg condition solution for the desired infrared wavelength; and

controlling the angle and wavelength of the writing beams to obtain a desired grating spacing inside the material for substantially normal incidence reflection at the desired infrared wavelength.

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**5,491,571**

**LIQUID CRYSTAL DISPLAY INCLUDING ELECTRODES AND DRIVER DEVICES INTEGRALLY FORMED IN MONOCRYSTALLINE SEMICONDUCTOR LAYER**

**Ronald L. Williams, San Marcos; Ogden J. Marsh, Carlsbad, and Steven E. Shields, San Diego, all of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.**

**Filed Jan. 19, 1993, Ser. No. 6,211**

**Int. Cl.**[6] **G02F** *1/136;1/1339;* **H01L** *27/12*

**U.S. Cl. 359—59** **13 Claims**

1. A livid crystal display comprising:

transparent first plate having an inner surface and an outer surface;

a monocrystalline semiconductor layer having an inner surface and an outer surface, said outer surface of the semiconductor layer being transparently adhered to said inner surface of the first plate;

a transparent first electrode which is adhered to said inner surface of the first plate;

a microelectronic driver device which is formed on said outer surface of the semiconductor layer and operatively connected to the first electrode;

a second plate having an inner surface and an outer surface;

a second electrode formed on said inner surface of the second plate;

spacer means for spacing said inner surfaces of the first and second plates from each other by a predetermining spacing;

sealing means for providing a peripheral seal around the first and second plates to define a sealed space between the first and second electrodes; and

a liquid crystal material provided in said space;

said spacer means and sealing means in combination comprising a continuous peripheral protrusion which extends from said inner surface of the semiconductor layer toward said inner surface of the second plate and has a height corresponding to said predetermined spacing.

**10**. A liquid crystal display comprising:

transparent first and second plates having inner and outer surfaces, said first plate laterally external of the second plate and has an inner surface;

a monocrystalline semiconductor layer having an inner surface and an outer surface, said outer surface of the semiconductor layer being transparently adhered to said inner surface of the first plate, said semiconductor layer comprising a peripheral portion having an outer surface which is transparently adhered to said inner surface of said peripheral portion of the first plate;

a transparent first electrode which is adhered to said inner surface of the first plate;

a microelectronic driver device which is formed on said outer surface of the semiconductor layer and operatively connected to the first electrode;

a second electrode formed on said inner surface of the second plate;

microelectronic circuit means for controlling said driver device, the circuit means being formed on said outer surface of said peripheral portion of the semiconductor layer;

spacer means for spacing said inner surfaces of the first and second plates from each other by a predetermined spacing;

sealing means for providing a peripheral seal around the first and second plates to define a sealed space between the first and second electrodes; and

a liquid crystal material provided in said space.

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**5,491,572**

## METHOD AND SYSTEM FOR DETECTING TROUBLE IN TWO-WAY SINGLE-FIBER OPTICAL TRANSMISSION

**Yasuko Ohara, Kawasaki, Japan, assignor to Fujitsu Limited, Kanagawa, Japan**

**Filed Feb. 28, 1994, Ser. No. 202,948**

**Claims priority, application Japan, Sep. 16, 1993, 5-253798**

**Int. Cl.[6] H04B** *10/08*

**U.S. Cl. 359—110** **28 Claims**

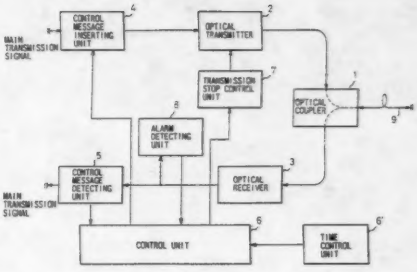
**1**. A method for detecting trouble occurring in a single-fiber two-way optical transmission system containing first and second optical terminal stations connected to each other through at least one two-way single optical fiber, comprising the steps of:

(a) detecting a first abnormality in a first optical signal received at the first optical terminal station;

(b) transmitting from the first optical terminal station to the second optical terminal station a first notice that the first optical terminal station will stop transmission of second optical signals when the first abnormality is detected in step (a);

(c) stopping transmission of the second optical signals from the first optical terminal station, after the transmission of the first notice in step (b); and

(d) detecting a second abnormality in a third optical signal received at the first optical terminal station after the stopping of the transmission of the second optical signals.

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**5,491,573**

## OPTICAL SIGNAL TRANSMISSION NETWORK

**Simon P. Shipley, Aylesbury, United Kingdom, assignor to GPT Limited, United Kingdom**

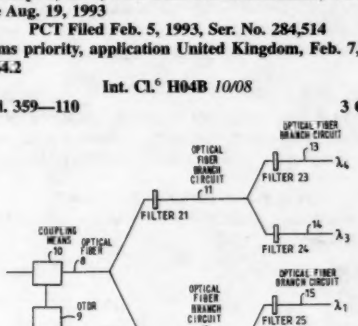
**PCT No. PCT/GB93/00247, § 371 Date Sep. 9, 1994, § 102(e) Date Sep. 9, 1994, PCT Pub. No. WO93/16533, PCT Pub. Date Aug. 19, 1993**

**PCT Filed Feb. 5, 1993, Ser. No. 284,514**

**Claims priority, application United Kingdom, Feb. 7, 1992, 9202564.2**

**Int. Cl.[6] H04B** *10/08*

**U.S. Cl. 359—110** **3 Claims**




**1**. An optical signal transmission network, comprising: a main optical fibre having a plurality of branch circuits, and associated with optical time domain reflectometry (OTDR) equipment connected so as to transmit an output signal through said main fibre and said branch circuits, each said branch circuit incorporating means for modulating the state of polarization of the output signal from the OTDR equipment in a manner unique to that branch, and the OTDR equipment incorporating means for detecting the state of polarization of the returned signals for distinguishing the signals returned from the individual branch circuits.

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**5,491,574**

## OPTICAL SIGNAL TRANSMISSION NETWORK

**Simon P. Shipley, Aylesbury, England, assignor to GEC-Marconi Limited, United Kingdom**

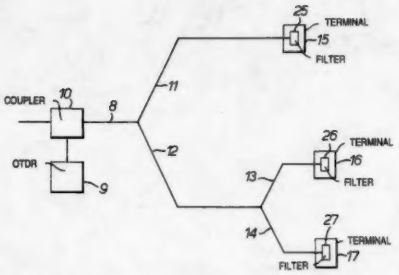
**Continuation of Ser. No. 187,637, Jan. 26, 1994, abandoned. This application Jun. 29, 1995, Ser. No. 496,659**

**Claims priority, application United Kingdom, Jan. 29, 1993, 9301753**

**Int. Cl.[6] G01N** *21/00;* **H04B** *10/08*

**U.S. Cl. 359—110** **7 Claims**

**1**. Fault location apparatus for use in an optical signal transmission network which includes a main optical fibre having a plurality of branch fibres, in which each final branch fibre of a chain of branches ends in a terminal unit, said fault location apparatus comprising: optical time domain reflectometry (OTDR) equipment connected to said network so as to transmit an output signal




through said main fibre and said branch fibres, and a filter incorporated in each said final branch fibre, said filter being operative for generating a reflected signal by initially reflecting the output signal back towards said OTDR equipment, said reflected signal being subsequently backscattered towards the filter to generate a backscattered signal, said filter being further operative for subsequently reflecting the backscattered signal towards the ODTR equipment, said OTDR equipment being operative to make measurements on the subsequently reflected backscattered signal.

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**5,491,575**

## PASSIVE OPTICAL TELECOMMUNICATION SYSTEM

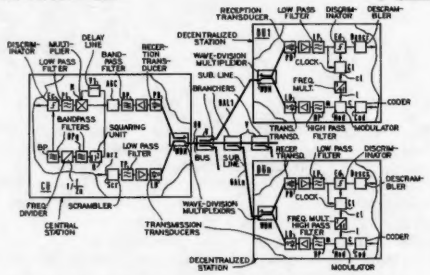
**Stephan Neidlinger, and Thomas Bolze, both of Munich, Germany, assignors to Siemens Aktiengesellschaft, Munich, Germany**

**Filed Feb. 4, 1994, Ser. No. 191,472**

**Claims priority, application European Pat. Off., Mar. 30, 1993, 93105294**

**Int. Cl.**[6] **H04J** *14/08*

**U.S. Cl. 359—137** **9 Claims**




1. A passive optical telecommunication system comprising:

a central station;

a plurality of decentralized stations;

a plurality of optical waveguide means respectively connected between said central station and said decentralized stations for permitting bidirectional optical communication between said central station and said decentralized stations,

central station electro-optical transducer means for transmitting downstream optical signals in a TDM cell stream via said optical waveguide means to all of said decentralized stations;

decentralized station opto-electrical transducer means at each decentralized station for receiving a cell in said downstream optical signals intended for that decentralized station;

decentralized station electro-optical transducer means in each decentralized station for transmitting burst mode upstream optical signals in TDMA from that decentralized station to said central station, said upstream optical signals having an intensity;

central station opto-electrical transducer means in said central station for receiving the respective upstream optical signal from each decentralized station;

means in each decentralized station for intensity-modulating the upstream optical signal from that decentralized station, including means for generating an electrical carrier signal and modulator means for modulating said electrical carrier signal with a source-coded useful signal to obtain a modulated electrical signal, said modulated electrical signal being supplied from said modulator means to the electro-optical transducer means in that decentralized station and effecting intensity modulation of the upstream optical signal therefrom; and

in each decentralized station, a high-pass filter connected between said modulator means and the electro-optical transducer means in that decentralized station.

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**5,491,576**

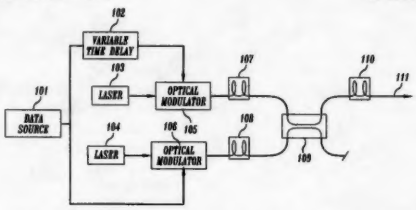
## DUAL-WAVELENGTH DATA TRANSMITTER FOR REDUCING FADING IN AN OPTICAL TRANSMISSION SYSTEM

**Neal S. Bergano, Lincroft, N.J., assignor to AT&T Corp., Murray Hill, N.J.**

**Filed Dec. 23, 1993, Ser. No. 173,288**

**Int. Cl.**[6] **H04B** *10/00*

**U.S. Cl. 359—156** **39 Claims**




1. An apparatus for reducing signal-to-noise ratio fading in an optical transmission path, comprising:

a means for generating an optical signal having a first and a second signal component where said first and second signal components have a wavelength difference $\Delta\lambda$;

a means for modulating said first and second signal components so that each of said first and second signal components carries substantially identical information in response to a data signal from a data source;

a means for varying said wavelength difference $\Delta\lambda$ in response to a signal representing a predetermined characteristic of said optical signal as received at a remote end of said transmission path;

a means for varying the phase between said modulated first and second components of said optical signal in response to said signal representing said predetermined characteristic;

a means for varying the state of polarization of each of said first and second components of said optical signal in response to said signal representing said predetermined characteristic;

a means for combining said first and second components of said optical signal into a combined optical signal; and

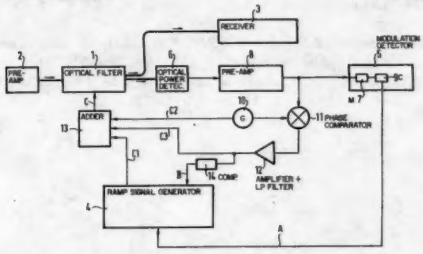
a means for varying the state of polarization of said combined optical signal in response to said signal representing said predetermined characteristic.

5,491,577

## TUNABLE OPTICAL FILTER TUNING DEVICE SUITABLE FOR USE IN THE RECEIVE PART OF AN OPTICAL TRANSMISSION SYSTEM

Olivier Gautheron, Montigny le Bretonneux, and Christian Coeurjolly, Vitry-sur-Seine, both of, France, assignors to Alcatel CIT, Paris, France

Filed Jul. 27, 1994, Ser. No. 281,162
Claims priority, application France, Jul. 30, 1993, 93 09425
Int. Cl.[6] H04B *10/06;10/04*
U.S. Cl. 359—194 7 Claims




1. A tunable bandpass optical filter tuning device suitable for use in the receive part of an optical transmission system for transmitting an information signal containing a spectrum of frequencies, and adapted to reject some optical noise superimposed on a wanted optical signal, said device including means for commanding displacement of the passband of said optical filter along a wavelength range, and tuning detector means adapted to detect the time at which said displacement can be stopped, said tuning detector means including an optical power detector receiving an optical signal from said optical filter, and modulation detector means for detecting any modulation of an electric signal from said optical power detector with the exception of a null frequency of said electric signal, said, displacement being stopped when said modulation detector means detects modulation of said electric signal from said optical power detector; wherein, said optical noise comprising noise created by a receive optical preamplifier, said modulation detector means comprises;

measuring means for measuring a magnitude characteristic of the amplitude of said electric signal from said optical power detector other than its mean value, said measuring means having a bandwidth excluding said null frequency and including some or all of the frequencies forming the spectrum of the information signal conveying information to be transmitted by the system; and

means for comparing a result supplied by said measuring means to threshold so that, according to whether the optical signal received by said optical power detector is entirely constituted of said optical noise or not, the result supplied by said measuring means is differently situated relative to said threshold,

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5,491,578

## OPTICS FOR PASSIVE SCAN ANGLE DOUBLING

Ellis D. Harris, Claremont, Calif., assignor to Xerox Corporation, Stamford, Conn.

Filed Dec. 19, 1994, Ser. No. 358,287
Int. Cl.[6] G02B *26/08*
U.S. Cl. 359—208 14 Claims

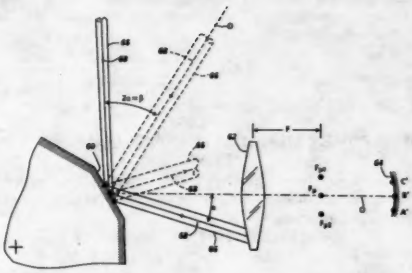
1. A scan angle doubling system comprising:

A) scanning means with at least one reflective facet and a normal which is perpendicular to the reflective facet,

B) a cylinder mirror with a tangential plane radius of curvature and a center of the radius of curvature,

C) a focussing lens means with a focal length and a focal point,

D) said scanning means, cylinder mirror, and focussing lens means being so arranged such that said scanning means and said cylinder mirror are opposed to each other and separated by a distance greater than the sum of the radius of curvature



plus the focal length, and said focussing lens means being interposed between said scanning means and said cylinder mirror such that the center of the radius of curvature of said cylinder mirror and the focal point of said focussing lens means are coincident, and

E) said scanning means, cylinder mirror, and focussing lens means being so constructed and arranged relative to each other to reflect a beam along a first path from the reflective facet, at a first angle measured from the optic axis, through said focussing lens means to be received by said cylinder mirror, said cylinder mirror reflecting the received beam along a second path through said focussing lens means to be received by the reflective facet, the reflective facet reflecting said received beam in a post scan direction, at a second angle measured from the normal which is greater than the first angle.

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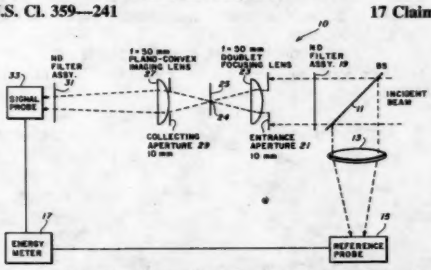
5,491,579

## BROADBAND THERMAL OPTICAL LIMITER FOR THE PROTECTION OF EYES AND SENSORS

Brian L. Justus; Alan L. Huston, and Anthony J. Campillo, all of Springfield, Va., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed May 31, 1994, Ser. No. 251,146
Int. Cl.[6] G02F *1/01*
U.S. Cl. 359—241 17 Claims


ND FILTER ASSY. 31
SIGNAL PROBE
f = 50 mm PLANO-CONVEX IMAGING LENS 27
f = 50 mm DOUBLET FOCUSING LENS 23
ND FILTER ASSY. 19
INCIDENT BEAM
COLLECTING APERTURE 29 10 mm
ENTRANCE APERTURE 21 10 mm
ENERGY METER
REFERENCE PROBE

1. A passive optical limiter for protecting a light-sensitive object from damage due to an incident light beam above a predetermined value of light intensity, said passive optical limiter comprising:

first optical means for focusing an incident light beam to a focal point;

a protective element disposed at the focal point, said protective element being responsive to a focused incident light beam below a predetermined intensity level for passing therethrough the focused incident light beam below the predetermined intensity level, said protective element being responsive to a focused incident light beam at or above the predetermined intensity level for deflecting substantially all of the focused incident light beam in different directions and passing therethrough only a small portion of the focused incident light beam at or above the predetermined intensity level; and

second optical means for focusing substantially all of the light passing through said protective element onto the light-sensitive object.

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**5,491,580**

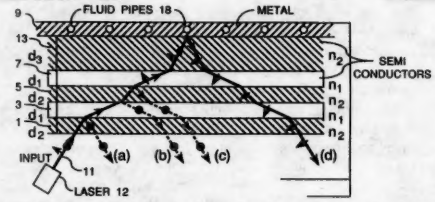
## HIGH POWER MULTILAYER STACK QUARTER WAVE PLATE

**Thomas R. O'Meara, Malibu, Calif., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.**

**Filed Dec. 17, 1992, Ser. No. 993,766**

**Int. Cl.[6] G02B** *5/30;5/28;7/195;* **G02F** *1/03*

**U.S. Cl. 359—247** **5 Claims**




1. Multilayer stack phase retardation plate apparatus comprising:

(a) a multilayer stack of low index of refraction and high index or refraction low loss dielectric mirror layers formed upon a reflective mirror substrate, the thicknesses of said mirror layers being chosen to satisfy the Bragg condition, producing constructive interference of multiple reflections from successive layers at a selected incident angle of light directed at said multilayered stack such that the Brewster angle is achieved at interfaces between the low and high index dielectric mirror layers; and

(b) further including means for fluid cooling the reflective mirror substrate, enabling said apparatus to receive and retransmit high power light beams.

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**5,491,581**

## RARE EARTH DOPED OPTICAL FIBRE AMPLIFIERS

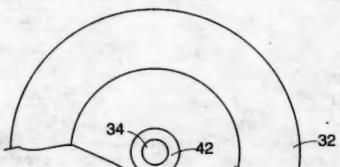
**Giacomo S. Roba, Cogoleto, Italy, assignor to Pirelli Cavi S.p.A., Milan, Italy**

**Filed Nov. 19, 1993, Ser. No. 154,957**

**Claims priority, application United Kingdom, Dec. 14, 1992, 9226024**

**Int. Cl.[6] H01S** *3/06*

**U.S. Cl. 359—341** **43 Claims**




1. An optical amplifier for amplifying an optical signal having a signal wavelength, comprising an optical fibre having an erbium doped core surrounded by cladding, a pump for pumping the fibre with pump light at a pump wavelength coupled to the fibre, input means for inputting a signal to be amplified to the amplifier and output means for outputting an amplified signal from the amplifier, wherein said fibre has a NA higher than 0.2 and wherein the difference in the coefficient of thermal expansion of the core adjacent the core/cladding interface and the coefficient of thermal expansion of the cladding at at least one radius less than 2 μm from said interface is lower than a predetermined value, corresponding to a ratio of erbium loss to background loss, at said pump wavelength, greater than a minimum ratio calculated by a given increasing function of the ratio erbium loss/background loss versus erbium loss, in which said minimum ratio is about 20 when erbium loss is 0.15 dB/m and about 120 when erbium loss is 3.5 dB/m.

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**5,491,582**

## LIGHT-RECEIVING MODULE

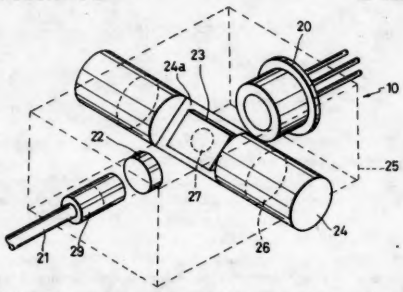
**Masayuki Fujita, Tokyo, Japan, assignor to NEC Corporation, Japan**

**Continuation of Ser. No. 936,934, Aug. 28, 1992, abandoned. This application Apr. 14, 1994, Ser. No. 227,578**

**Claims priority, application Japan, Aug. 29, 1991, 3-218491**

**Int. Cl.[6] H01S** *3/10;* **G02B** *6/32*

**U.S. Cl. 359—341** **15 Claims**




1. A light-receiving module which is coupled to an optical fiber and receiving a light signal amplified by a fiber optic amplifier, comprising;

a photo-detecting device for converting a light signal into an electric signal;

a lens optically coupling one end of an optical fiber and said photo-detecting device; and

a bandpass filter plate provided between said photo-detecting device and said lens, without any other component between said photo-detecting device and said bandpass filter plate, said bandpass filter plate being supported by a means effective for enabling said bandpass filter to be rotated around an axis which is parallel to its face to thereby enable adjusting a center of wavelength of transmission without reducing a light receiving sensitivity associated with transmission of light from said optical fiber to said photo-detecting device, wherein a light signal amplified by a fiber optic amplifier is emitted from said end of said fiber to said lens.

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**5,491,583**

## INFRARED LENS SYSTEMS

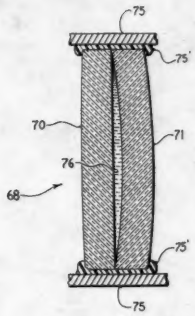
**Paul N. Robb, Sunnyvale, Calif., assignor to Lockheed Missiles & Space Company, Inc., Sunnyvale, Calif.**

**Filed Jun. 17, 1994, Ser. No. 261,164**

**Int. Cl.[6] G02B** *13/14;5/08;1/06*

**U.S. Cl. 359—356** **12 Claims**

5. A lens system comprising a first rigid lens element, a second rigid lens element and a liquid lens element, said liquid lens element being contained between said first and second rigid lens elements, said first and second rigid lens elements and said liquid lens element co-acting with each other to cause said lens system to have rms wavefront error less than 0.1 over a continuous infrared wavelength band; wherein said first and second rigid lens elements are made of solid material having infrared transparency; wherein said liquid lens element is made of a liquid having infrared transparency and wherein said first and second rigid lens elements and said liquid lens element are configured and positioned with respect to each other according to a design form specified as follows:




| Surface No. | Radius (inches) | Thickness (inches) | $N_d$ | $V_d$ | Material |
|---|---|---|---|---|---|
| 1 | 2.408983 | 0.014031 | 1.768239 | 72.01 | Sapphire |
| 2 | −6.241043 | 0.004845 | 1.459453 | 48.75 | 459487 |
| 3 | −0.265632 | 0.014031 | 1.768239 | 72.01 | Sapphire |
| 4 | −0.424980 | 1.001170 | | | Air |

wherein the surfaces of the optic elements are numbered consecutively from left to right along the optic axis, $N_d$ is the index of refraction at the wavelength of the sodium spectral line, and $V_d$ is the Abbe number at the same wavelength.

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**5,491,584**

## PIVOTAL, LARGE AREA CINEMATOGRAPHIC SCREEN FOR OPEN-AIR PERFORMANCES

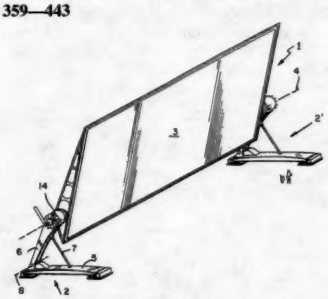
**Albert Schlienger, Hagenbuch, Switzerland, assignor to Cinerent Open Air AG, Zollikon, Switzerland**

**Filed Jun. 16, 1994, Ser. No. 260,564**

**Claims priority, application European Pat. Off., Jun. 20, 1993, 93109835**

**Int. Cl.[6] G03B** *21/56*

**U.S. Cl. 359—443** **9 Claims**




1. A projection wall, especially for open air cinemas, comprising a substantially rigid screen section, said screen section being pivotally supported by pivoting means for pivoting said screen section from a substantially vertical operating position into a forward and a backward direction about a horizontal pivot axis, said screen section comprising a screen frame and a screen surface, said screen surface being held by said screen frame, wherein said screen frame comprises a single torque absorbing traverse.

**5,491,585**

## PORTABLE REAR SCREEN TELEVISION CABINET

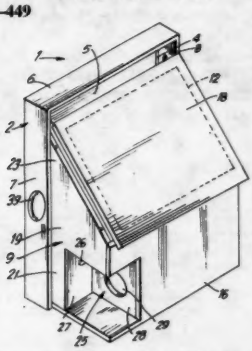
**Eugene Dolgoff, Westbury, N.Y., assignor to Projectavision, Inc., New York, N.Y.**

**Continuation of Ser. No. 979,135, Nov. 20, 1992, abandoned.**

**This application Apr. 7, 1994, Ser. No. 224,053**

**Int. Cl.[6] G03B** *21/56*

**U.S. Cl. 359—449** **16 Claims**




1. A collapsible rear screen television cabinet, comprising:

a front portion having a top, two sides and a front face;

a rear screen supported on said front face;

a mirror system comprising at least one mirror for reflecting an image from a projection means onto the rear screen;

a base panel attached to the front portion to support the projection means in an operational condition of the cabinet; and

a collapsible rear assembly forming with said front portion substantially closing said cabinet, wherein said cabinet in a collapsed condition has a substantially smaller profile than in the operational condition.

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**5,491,586**

## ELASTOMERIC RETROREFLECTIVE STRUCTURE

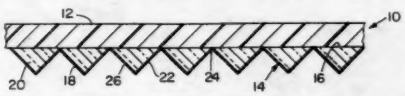
**Edward D. Phillips, Oakville, Conn., assignor to Reflexite Corporation, Avon, Conn.**

**Continuation of Ser. No. 93,777, Jul. 19, 1993, abandoned.**

**This application Jun. 28, 1995, Ser. No. 495,371**

**Int. Cl.[6] G02B** *5/124*

**U.S. Cl. 359—530** **4 Claims**




1. A method for forming a retroreflective structure, which can be significantly stretched without significantly diminishing the retroreflective properties of the retroreflective structure, comprising the steps of:

a) polymerizing a polymerizable material in a suitable mold to form a rigid, non-extensible prism array having valleys between said prisms, whereby said prisms can split along said valleys when a tensile force is applied to the retroreflective structure; and

b) applying an elastomeric film to said rigid, non-extensible prism array, which allows the retroreflective structure to stretch while allowing the prisms to remain in position with respect to the elastomeric film, thereby forming the retroreflective structure, which can be significantly stretched without significantly diminishing the retroreflective properties of the retroreflective structure.

**5,491,587**

## COLLIMATING LENS FOR OPTICAL SYSTEM USING SEMICONDUCTOR LASER

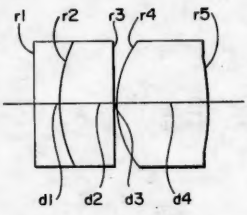
**Makoto Iwaki; Koichi Maruyama, and Makoto Iki, all of Tokyo, Japan, assignors to Asahi Kogaku Kogyo Kabushiki Kaisha, Tokyo, Japan**

**Continuation-in-part of Ser. No. 769,764, Oct. 4, 1991, Pat. No. 5,173,809, which is a continuation of Ser. No. 486,600, Feb. 28, 1990, abandoned. This application Jul. 6, 1992, Ser. No. 909,040**

**Claims priority, application Japan, Feb. 28, 1989, 1-47589; Feb. 28, 1989, 1-47590; Jul. 25, 1991, 3-276080**

**Int. Cl.[6] G02B** *27/30;13/18*

**U.S. Cl. 359—641** **11 Claims**




1. A collimating lens system for an optical system using a laser, for collimating a divergent beam of light, said collimating lens system comprising:

a converging lens which has both surfaces formed as aspherical surfaces; and

a chromatic aberration correction element adapted to correct a chromatic aberration of said converging lens, said element being constructed of positive and negative lenses cemented to each other, said positive lens and said negative lens having substantially the same refractive index, and having different dispersion.

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**5,491,588**

## AFOCAL ZOOMING OPTICAL SYSTEM

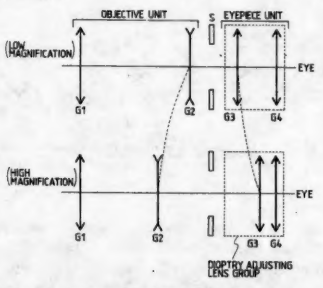
**Ryota Ogawa, Tokyo, and Hiroyuki Kato, Nagano, both of, Japan, assignors to Asahi Kogaku Kogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed Nov. 29, 1991, Ser. No. 800,118**

**Claims priority, application Japan, Nov. 30, 1990, 2-335935**

**Int. Cl.[6] G02B** *15/14*

**U.S. Cl. 359—676** **5 Claims**




1. An afocal zooming optical system comprising a plurality of lens components, wherein at least a first and a second of said plurality of lens components are movable along an optical axis for changing a magnification of the optical system and said first lens component is moved while said second lens component remains stationary for dioptry adjustment without changing a magnification of the optical system, wherein at least a third of said plurality of lens components is movable for dioptry adjustment and is not movable for changing a magnification ,of the optical system.

**5,491,589**

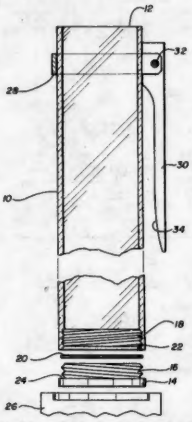
## METER READING APPARATUS

**David L. Haymond, 2816 McKnipp Dr., Ashland, Ky. 41102**

**Filed Jan. 4, 1993, Ser. No. 883**

**Int. Cl.[6] G02B** *5/00;7/02;27/02*

**U.S. Cl. 359—895** **3 Claims**




1. Apparatus to enable a user to read submerged water meters, comprising; a clear annealed polycarbonate viewing tube, said viewing tube having an upper end and a lower end, said lower end having inner threads; a rigid circular lens section having an integral annular threaded section for detachably engaging with said inner threads of the lower end of said viewing tube, said lens section and said annular threaded section comprising a unitary polycarbonate member; a ring seat at the lower end of said viewing tube; a ring seal shoulder provided on an inside surface of said lens section; and an **0** ring seal disposed around said annular threaded section and between said ring seat and said ring seal shoulder.

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**5,491,590**

## ROTARY HEAD RECORDING AND PLAYBACK APPARATUS AND METHOD

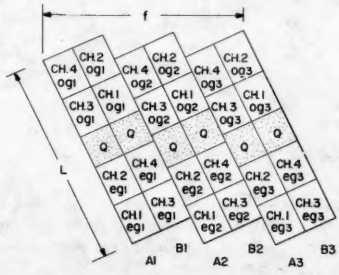
**Kazuhito Endo, and Masayuki Ishida, both of Nagaokakyo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan**

**Continuation of Ser. No. 520,741, May 9, 1990, abandoned. This application Mar. 15, 1993, Ser. No. 31,482**

**Claims priority, application Japan, May 12, 1989, 1-119207; May 12, 1989, 1-119208; May 12, 1989, 1-119209; Jan. 20, 1989, 1-274353; Dec. 26, 1989, 1-341436**

**Int. Cl.[6] G11B** *5/02;5/09*

**U.S. Cl. 360—19.1** **29 Claims**




1. An apparatus for recording digital information signals from two or more channels, the information signals being inputted for a predetermined time, on a recording medium to form four or more tracks, the information being distributed along the tracks, each

track having a number of regions equal to the number of channels, the digital information signals being divided into m number of groups for each channel, m being equal to the number of tracks, comprising:

recording signal processing means for interleaving the digital information signals and for outputting the interleaved digital information signals onto the recording medium to form the four or more tracks; and

recording means for recording the signals supplied from said recording signal processing means on the recording medium to form the tracks;

said recording signal processing means dividing the digital information signals into odd samples and even samples for each channel, dividing the odd samples for each channel into m/2 sample groups and dividing the even samples for each channel into m/2 sample groups, consecutive samples of a same channel being assigned to different sample groups;

said recording signal processing means interleaving the sample groups such that the sample groups recorded in the regions of each track are from different channels and sample groups containing consecutive samples of a same channel are located in different regions of adjacent tracks, the different regions being formed at different positions in a longitudinal direction of the tracks.

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**5,491,591**

## SERIES OF IMAGES REPRODUCED FROM ADDRESSABLE STORAGE

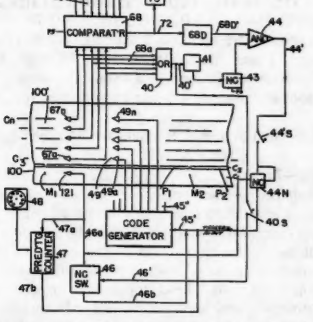
**Jerome H. Lemelson, Suite 286, Unit 802, 930 Tahoe Blvd., Incline Village, Nev. 89451-9436**

**Continuation of Ser. No. 719,964, Jun. 24, 1991, abandoned, which is a division of Ser. No. 363,121, Jun. 8, 1989, abandoned, which is a continuation of Ser. No. 933,251, Nov. 21, 1986, abandoned, which is a continuation of Ser. No. 158,286, Jun. 10, 1980, abandoned, which is a continuation-in-part of Ser. No. 225,173, Aug. 27, 1962, Pat. No. 4,213,163, which is a continuation-in-part of Ser. No. 668,348, Jun. 27, 1957, Pat. No. 3,051,777, which is a continuation-in-part of Ser. No. 544,991, Nov. 4, 1955, Pat. No. 2,959,636, and a continuation-in-part of Ser. No. 515,417, Jun. 14, 1955, Pat. No. 3,003,109.**

**This application Jan. 14, 1992, Ser. No. 820,563**

**Int. Cl.[6] H04N** *5/78*

**U.S. Cl. 360—35.1** **38 Claims**




1. An apparatus for generating an animated motion picture on an electronic display screen, comprising:

(a) a storage member comprising a magnetic disk and having a plurality of defined storage locations, each of said storage locations being identifiable by a respective location code;

(b) a storage system structured to receive and store in said storage member a plurality of discrete image signals corresponding to a plurality of still images, each of said still images defining part of a specific animation sequence, by: (1) determining selected of said storage locations of said storage member at which to store selected of said discrete image signals; (2) identifying the location codes corresponding to the selected storage locations; (3) assigning said identified location codes to the corresponding discrete image signals selected for storage at said selected locations; (4) assigning at least one cross-reference code relating to a specific animation to the corresponding selected discrete image signals; (5) controlling the storage at said selected locations of said corresponding discrete image signals; and (6) controlling the storage of said cross-reference code in said storage member;

(c) a reproduction system structured to use said assigned location codes to select and reproduce from said storage member a plurality of said stored discrete image signals corresponding to a specific animation sequence and to generate discrete display signals corresponding to said selected discrete image signals; and

(d) a display system coupled to the reproduction system and including a storage device structured to store one of said discrete display signals corresponding to said selected discrete image signal, a video display screen, and a recording device coupled to sequentially replace in the storage device a series of said discrete display signals to produce said specific animated motion picture on said display screen.

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**5,491,592**

## METHOD OF AND APPARATUS FOR REPRODUCING A RECORDING MEDIUM

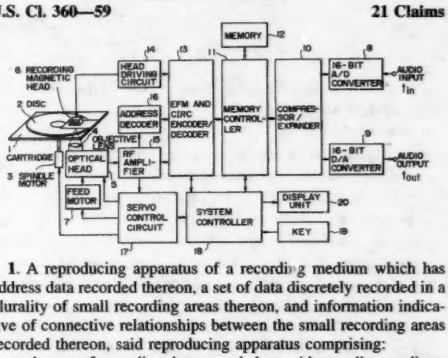
**Junichi Aramaki, Chiba, and Nobuyuki Kihara, Tokyo, both of, Japan, assignors to Sony Corporation, Japan**

**Filed Dec. 21, 1993, Ser. No. 171,107**

**Claims priority, application Japan, Jan. 6, 1993, 5-016697**

**Int. Cl.[6] G11B** *5/00*

**U.S. Cl. 360—59** **21 Claims**




1. A reproducing apparatus of a recording medium which has address data recorded thereon, a set of data discretely recorded in a plurality of small recording areas thereon, and information indicative of connective relationships between the small recording areas recorded thereon, said reproducing apparatus comprising:

read means for reading data recorded on said recording medium;

a memory for storing the information indicative of connective relationships between the small recording areas read by said read means; and

a controller for executing control in high-speed reproduction so that said read means repeatedly accesses preceding small recording areas in accordance with the information stored in said memory and reads the data stored in the preceding small recording areas in units of a predetermined data amount and for further executing control so that, when said read means has moved to a position outside a preceding small recording area, said read means accesses a position in a subsequent small recording area in a connective relationship with the preceding small recording area, and, when the position in said subsequent small recording area is off a start address of said subsequent small recording area and within a predetermined range of the start address of said subsequent small recording area, said read means reads data from the recording medium starting at said position, wherein said controller includes judgement means for judging whether the data length of a subsequent small recording area is smaller than a predetermined data length, and, when the length is judged to be

smaller than the predetermined length, said read means is caused to access a next-subsequent small recording area in accordance with the information stored in said memory.

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**5,491,593**

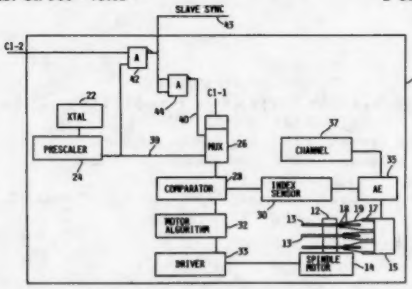
## DISK DRIVE SPINDLE SYNCHRONIZATION APPARATUS AND METHOD

**James E. Donaldson, Rochester, Minn., assignor to International Business Machines Corporation, Armonk, N.Y.**

**Filed Sep. 10, 1993, Ser. No. 119,915**

**Int. Cl.[6] G11B** *15/46*

**U.S. Cl. 360—73.03** **1 Claim**




**1**. A synchronizing control system for an array of disk drive data storage devices comprising

an array of disk drives;

said array of disk drives being partitioned into a plurality of subarrays with each subarray including multiple drives;

each said disk drive including a plurality of data storage disks mounted on a spindle for rotation in unison with the rotor of a spindle motor, an oscillator assembly that provides a precision index signal, spindle motor control circuit means for controlling the rotational velocity of said spindle motor, synchronizing circuit means for enabling synchronous operation with other of said disk drives, first switch means for interconnecting said precision index signal to said spindle motor control circuit mean, directly when in one state or through said synchronizing circuit means when in another state, said synchronizing circuit means including second switch means which is activated to select the oscillator assembly of that drive as the source of the precision index signal for other disk drives during synchronous operation;

means connecting the synchronizing circuit means of each disk drive within an array to a common subarray line;

third switch means, associated respectively with each subarray for connecting the common line of the associated subarray to a global common line;

means for connecting one and only one of said oscillator assemblies to said global common line; and

fourth switch means associated respectively with each subarray to selectively connect the subarray common line to said global common line, whereby the subarray can either operate in synchronization with the index signal supplied by said global common line or in synchronization with an index signal generated within said subarray.

**5,491,594**

## MAGNETIC RECORDING/REPRODUCING APPARATUS

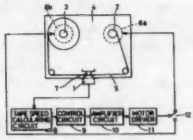
**Tatsushi Yamamoto; Sigeaki Kakiwaki; Tohru Okuda; Hideo Okada, all of Nara; Masaji Tsuji, Yamatokouriyama; Takamitsu Tadera, Tenri, and Akihito Yoshimoto, Yamatotakada, all of, Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan**

**Filed May 20, 1993, Ser. No. 65,133**

**Claims priority, application Japan, May 21, 1992, 4-128603; May 21, 1992, 4-128604; May 21, 1992, 4-128605; May 21, 1992, 4-128606; Jun. 5, 1992, 4-145524; Jul. 27, 1992, 4-199723**

**Int. Cl.[6] G11B** *15/093*

**U.S. Cl. 360—73.04** **11 Claims**




**1**. A magnetic recording/reproducing apparatus for recording and/or reproducing information in and/or from a magnetic tape with a magnetic head, said magnetic recording/reproducing apparatus comprising:

speed detecting means for a travelling magnetic tape;

reel driving means for a take-up reel; and

control means for controlling the rotational speed of said reel driving means for said take-up reel, on the basis of speed information obtained by said tape speed detecting means,

said control means controlling the rotational speed of said reel driving means for said take-up reel, on the basis of said speed information obtained by said magnetic tape speed detecting means, thereby controlling the travelling speed of said magnetic tape,

means for maintaining the frequency of resonance, appearing due to total equivalent inertia moment related to said magnetic tape and said take-up reel and that related to a supply reel, higher than the frequency of antiresonance appearing due to total equivalent inertia moment related to said magnetic tape and said supply reel between a start and an end of an operation for winding said magnetic tape on said take-up reel in recording/reproduction.

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**5,491,595**

## MAGNETIC HEAD GUIDANCE AND CALIBRATION SYSTEM AND METHOD DESCRIPTION

**Roger C. Alsborg, Orange; Jose I. DeArmas, Alta Loma; Scott L. Hanson, Costa Mesa; William B. Higgins, Silverado; Philip G. Miyasato, Orange, and Ashok B. Nayak, Glendora, all of Calif., assignors to Conner Peripherals, Inc., San Jose, Calif.**

**Filed Sep. 9, 1992, Ser. No. 942,256**

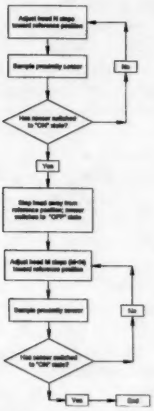
**Int. Cl.[6] G11B** *21/12*

**U.S. Cl. 360—75** **2 Claims**

**1**. In a computer peripheral magnetic tape drive device, having a magnetic head adapted to read and write on magnetic tape, said head being connected to a lead screw driven by a stepper motor for translational movement across said magnetic tape, a method of repeatably positioning said head at a predetermined reference position using a contactless head stop device, having components mounted proximate said head and at said reference position for indicating attainment of said reference position by said head only when said components are in a predetermined juxtaposition, comprising the steps of:

a) stepping said head toward said stop device component at said reference position at a first rate while sampling said stop device for an output signal indicative of attainment of said reference position;

b) stopping said stepping when said output of said stop device changes from a first state to a second state which is indicative of said attainment of said reference position;



c) stepping said head in a reverse direction for a first predetermined number of steps to change said stop device output from said second state to said first state;

d) stepping said head toward said stop device component at said reference position a second predetermined number of steps;

e) sampling said stop device;

f) repeating steps d) and e) until said stop device switches from said first state to said second state; and

g) halting said stepping.

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**5,491,596**

**PRESSURE-DIFFERENTIAL PASSAGEWAY FOR CLEANING A MAGNETIC DISK DRIVE**

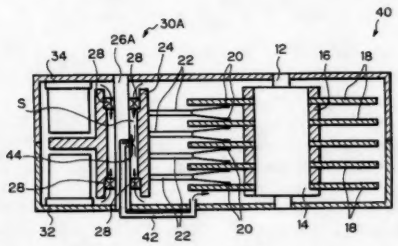
**Seiki Kobori, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan**

**Continuation of Ser. No. 91,131, Jul. 14, 1993, abandoned. This application Jan. 23, 1995, Ser. No. 376,448**

**Claims priority, application Japan, Jul. 14, 1992, 4-186409**

**Int. Cl.**[6] **G11B** *33/14;5/55*

**U.S. Cl. 360—97.03** **5 Claims**




1. An air cleaning device in a magnetic disk drive having a spindle hub supporting a plurality of magnetic disks, a head positioning mechanism constituted by a plurality of arms disposed in a casing of said magnetic disk drive, each of said arms carrying a magnetic head at one end, an arm holder supporting the other end of each of said arms, a shaft supporting said arm holder, and bearings interposed between said arm holder and said shaft to rotatably support said arm holder, said air cleaning device comprising:

a passageway providing fluid communication, through an interior bore of said shaft, between a first area delimited by the arm holder, the shaft, and the bearings and a second area generally defined by the neighborhood of the magnetic disks, said passageway having an opening disposed in close proximity to a surface of a selected one of said magnetic disks at a location radially remote from said spindle hub to thereby define a gap between said opening and said selected magnetic disk; and

a filter located at a predetermined position of said passageway;

wherein, rotation of said selected magnetic disk creates a low atmospheric pressure in said gap to thereby induce suction through said opening to cause a fluid motion from said first area to said second area through said filter to capture grease generated oil mist and other contaminants from the first area, and prevent the oil mist and the other contaminants from passing into the second area along with the fluid motion.

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**5,491,597**

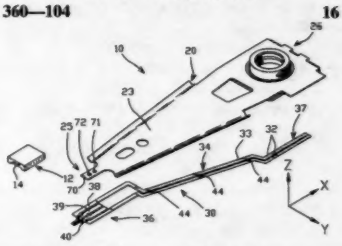
**GIMBAL FLEXURE AND ELECTRICAL INTERCONNECT ASSEMBLY**

**Jeffry S. Bennin, Hutchinson; Todd Boucher, Stewert, both of Minn.; Jeffrey W. Green, Sioux Falls, S. Dak.; Gary E. Gustafson, Darwin, Minn.; Ryan Jurgenson, Hutchinson, Minn., and Brent D. Lien, Minneapolis, Minn., assignors to Hutchinson Technology Incorporated, Hutchinson, Minn.**

**Filed Apr. 15, 1994, Ser. No. 227,960**

**Int. Cl.**[6] **G11B** *5/54;21/18*

**U.S. Cl. 360—104** **16 Claims**




1. A combined gimbal flexure and electrical interconnect assembly for attachment to a disk drive head suspension assembly including a load beam and for supporting a head slider supported adjacent a distal end thereof, the gimbal flexure and interconnect assembly comprising, in combination:

a set of load beam traces including one or more electrically insulated, generally parallel, elongated, low-profile conductors each of which is constructed of a single layer of spring material shaped and arranged for conforming to the surface of the load beam and each of which is supported by the load beam; and

a set of gimbal traces, each of which extends from a corresponding load beam trace and projects from the load beam at the distal end thereof, each of said gimbal traces terminating in a pad portion adapted for attachment to the body of said slider for supporting said slider for gimballed motion relative to said load beam and for conducting electrical signals to and from the slider, the portion of the gimbal traces between the load beam and the pad portion constructed and arranged for exclusively supporting the pad portion thereof for gimbal movement.

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**5,491,598**

**ROTARY ACTUATOR VIBRATION DAMPER**

**John D. Stricklin, Oklahoma City, and John B. Blanks, Edmond, both of Okla., assignors to Seagate Technology, Inc., Scotts Valley, Calif.**

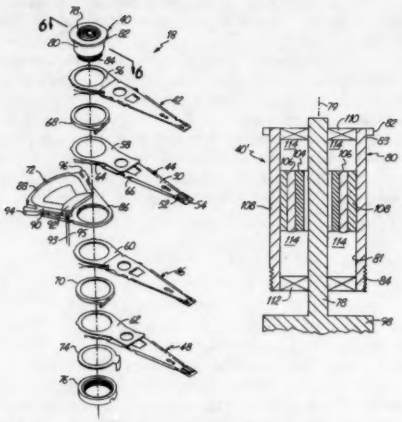
**Filed May 6, 1994, Ser. No. 238,907**

**Int. Cl.**[6] **G11B** *5/55;* **H02K** *5/24;* **F16C** *27/00*

**U.S. Cl. 360—106** **17 Claims**

1. An actuator system for moving a head gimbal assembly relative to a disc in a disc drive, the actuator system comprising:

an actuator providing a driving force;



an actuator assembly movable by the actuator and coupled to the head gimbal assembly for moving the head gimbal assembly relative to the disc in response to the driving force provided by the actuator; and

wherein the actuator assembly includes:

a shaft having an outer surface, the shaft generally defining an axis of rotation;

a sleeve having an inner surface, the sleeve disposed about the shaft;

bearing means, disposed about the shaft, for rotatably mounting the sleeve to the shaft;

an actuator arm coupled to the sleeve for rotation with the sleeve and for supporting the head gimbal assembly, the actuator arm having a first major surface generally defining a plane; and

a damper having a damping member and a damping material coupled to the damping member, the damping material coupled to the sleeve and disposed therein, for damping vibrations of the actuator arm in the plane defined by the actuator arm.

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**5,491,599**

## MAGNETIC DISK APPARATUS

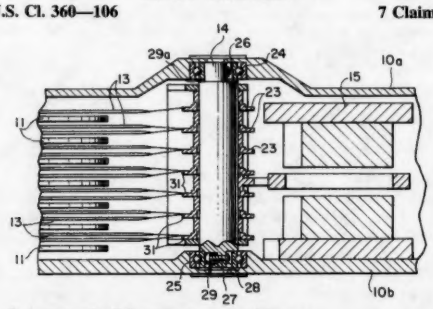
**Chikayuki Sogabe, Odawara, Japan, assignor to Hitachi, Ltd., Tokyo, Japan**

**Filed Jun. 24, 1994, Ser. No. 265,300**

**Claims priority, application Japan, Jun. 30, 1993, 5-161204**

**Int. Cl.[6] G11B** *21/02*

**U.S. Cl. 360—106** **7 Claims**



**1**. A magnetic disk apparatus comprising:

a plurality of magnetic disks arranged parallel to each other;

means for supporting and rotating said magnetic disks;

sliders arranged close to the surfaces of said magnetic disks;

suspension arms each supporting one of said sliders at one end thereof;

a pivot shaft for rotating said suspension arms; and

a plurality of spacers respectively connecting the other ends of said suspension arms to said pivot shaft, wherein each of said spacers includes a first section engaged with said pivot shaft, a second section connected to said suspension arm, and a through-hole extending through these two sections, said pivot shaft extending through said through-hole, said through-hole including a first hole section disposed in said first section and a second hole section disposed in said second section, communicating with said first hole section and having a diameter larger than the outer diameter of said pivot shaft, said first section of said spacer being deformed to frictionally grip said pivot shaft, each of said spacers being provided with means for preventing the deformation of said first section from being propagated to said second section.

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**5,491,600**

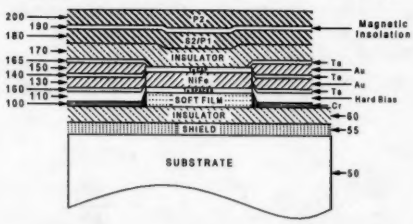
## MULTI-LAYER CONDUCTOR LEADS IN A MAGNETORESISTIVE HEAD

**Mao-Min Chen, San Jose; Mary K. Gutberlet, Salinas; Mohamad T. Krounbi; Jacqueline K. Latimer, both of San Jose, and Mustafa Pinarbasi, Morgan Hill, all of Calif., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed May 4, 1994, Ser. No. 237,744**

**Int. Cl.[6] G11B** *5/127;5/33*

**U.S. Cl. 360—113** **20 Claims**




**1**. A magnetoresistive sensor comprising:

a magnetoresistive material, formed on a substrate, having a first edge and a second edge;

a first hard bias layer;

a second herd bias layer;

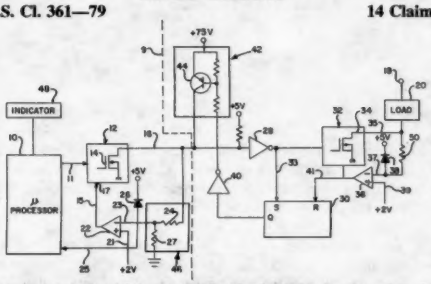
a first multilayered conductive lead structure formed over the first hard bias layer electrically connected to the first edge; and

a second multilayered conductive lead structure formed over the second hard bias layer electrically connected to the second edge, wherein the first and second conductive lead structures are constructed of multiple layers of thin film materials, wherein the layers alternate between a thin film of a refractory metal and a thin film of a highly conductive metal, and further wherein the first and second conductive lead structures have a first refractory layer formed in contact with the first and second hard biased layers, respectively, and have at least a second refractory layer interlayered between two layers composed of the highly conductive metal.

## 5,491,601
## CIRCUIT FOR DETECTING A SHORT CIRCUIT IN A LOW SIDE DRIVEN LOAD

**Robert T. Arntz, Auburn Hills, Mich., assignor to Chrysler Corporation, Highland Park, Mich.**

**Filed Dec. 15, 1994, Ser. No. 358,090**
**Int. Cl.[6] H02H** *3/18*
**U.S. Cl. 361—79** **14 Claims**




1. A circuit for driving one side of a load that has its other side electrically connected to a first voltage source, and for providing short circuit detection, comprising:

a control circuit that provides control pulse signals over a single conductor;

a remote driver with an input connected to the single conductor and an output connected to the one side of the load and a disable terminal for controlling the state of said remote driver, said remote driver connecting the one side of the load to a low level compared to the first voltage in response to the control signals provided to the input over the single conductor;

a short circuit detector that compares the remote driver output with a reference voltage so as to detect a short circuit between the first voltage source and the remote driver output, said short circuit detector provides a short circuit detection signal in response to the comparison, said detection signal being applied to the disable terminal of the remote driver as a result of detecting the short circuit; and

a high voltage circuit with an output connected to the single conductor, said detection signal being effective to cause said high voltage circuit to provide a high voltage signal on the single conductor at the termination of the control pulse signal.

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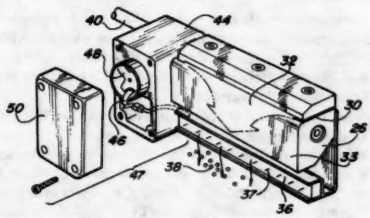
## 5,491,602
## AIR DISTRIBUTING AND IONIZING SYSTEMS

**Paul E. Horn, Waterford, Mich.; Mark N. Horenstein, Newton, Mass., and Donald G. Parent, Windham, Me., assignors to Paul Horn Enterprises, Inc., Waterford, Mich.**

**Filed May 12, 1995, Ser. No. 440,518**
**Int. Cl.[6] H05F** *3/00*
**U.S. Cl. 361—228** **20 Claims**




1. An air distributing and ionizing system comprising:

an air distribution body receiving a flow of compressed air;

an ionizing apparatus for creating an ion cloud positioned in an air flow created by said air distribution body;

a source of compressed air in fluid communication with said air distribution body;

a converter in fluid communication with said source of compressed air;

at least a portion of the air from said source of compressed air passing over said converter, said converter being driven by the air flow portion; and

said converter being operably connected to provide an electric power source to said ionizing apparatus upon being driven by the air flow portion.

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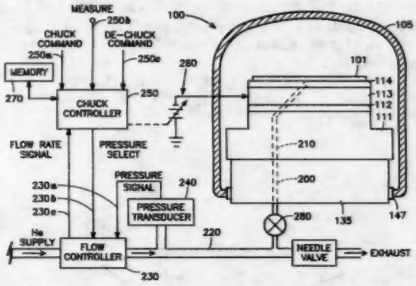
## 5,491,603
## METHOD OF DETERMINING A DECHUCKING VOLTAGE WHICH NULLIFIES A RESIDUAL ELECTROSTATIC FORCE BETWEEN AN ELECTROSTATIC CHUCK AND A WAFER

**Manoocher Birang, Los Gatos; Jian Ding, San Jose, both of Calif., and Hyman J. Levinstein, Berkeley Heights, N.J., assignors to Applied Materials, Inc., Santa Clara, Calif.**

**Filed Apr. 28, 1994, Ser. No. 235,012**
**Int. Cl.[6] H02N** *13/00*
**U.S. Cl. 361—234** **61 Claims**




1. A method of determining an optimum de-chucking voltage for nullifying residual electrostatic forces on a wafer in an electrostatic chuck for removal of the wafer from the chuck, comprising:

holding said wafer on said electrostatic chuck by applying an electrostatic potential to said chuck;

introducing a gas between said wafer and said chuck;

reducing said electrostatic potential of said chuck while observing a rate of leakage of said gas from between said wafer and said chuck; and

recording as said optimum dechucking voltage the value of said electrostatic potential obtaining when said rate of leakage exceeds a predetermined threshold.

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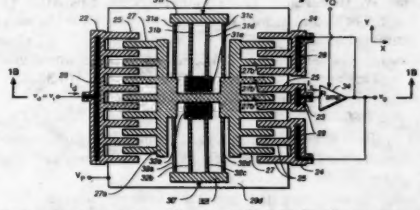
## 5,491,604
## Q-CONTROLLED MICRORESONATORS AND TUNABLE ELECTRONIC FILTERS USING SUCH RESONATORS

**Clark T.-C. Nguyen, Berkeley, and Roger T. Howe, Lafayette, both of Calif., assignors to The Regents of the University of California, Oakland, Calif.**

**Filed Dec. 11, 1992, Ser. No. 989,396**
**Int. Cl.[6] H01G** *5/011*
**U.S. Cl. 361—278** **19 Claims**



1. A resonator system with a controlled quality factor, comprising:

a resonator having first, second and third ports, and a quality factor greater than said controlled quality factor;

an amplifier having an input and an output, and a gain high enough to render said controlled quality factor substantially independent of the quality factor of said resonator; and

wherein said second port is connected to the input of said amplifier and the output of said amplifier is connected to said third port so that when an input signal is applied to the resonator system at said first port, an output signal at said second port is applied to the input of said amplifier, and an output of said amplifier is applied to said third port for providing negative feedback to said resonator.

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**5,491,605**

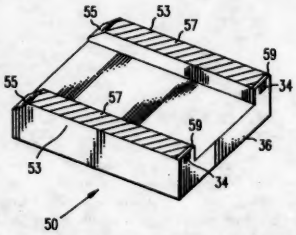
## SHORTED MAGNETORESISTIVE HEAD ELEMENTS FOR ELECTRICAL OVERSTRESS AND ELECTROSTATIC DISCHARGE PROTECTION

**Timothy S. Hughbanks, Morgan Hill; Hin Pong E. Lee, San Jose; Peter B. P. Phipps, Saratoga; Neil L. Robertson, Campbell, and Albert J. Wallash, Morgan Hill, all of Calif., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed Dec. 23, 1994, Ser. No. 363,460**

**Int. Cl.[6] G11B** *5/127;5/10*

**U.S. Cl. 360—113** **9 Claims**




1. A method for protecting a magnetoresistive sensor element in a magnetic head assembly from damage caused by electrostatic discharge, said magnetic head assembly supported on a substrate and including at least a magnetoresistive sensor element disposed in spaced relationship between a pair of magnetic shield elements, a pair of electrical lead conductors, each of said electrical lead conductors attached to said magnetoresistive sensor element at opposite ends thereof, said magnetoresistive sensor element, said magnetic shield elements and said lead conductors being exposed at an air bearing surface of said magnetic head assembly, said method comprising the step of coating at least a portion of said air bearing surface with a layer of conductive material shorting said magnetoresistive sensor element, said magnetic shield elements and said conductive leads together and to said substrate.

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**5,491,606**

## PLANAR MAGNETORESISTIVE HEAD WITH AN IMPROVED GAP STRUCTURE

**Victor W. Hesterman, 12715 Canario Way, Los Altos Hills, Calif. 94022, and Manoj K. Bhattacharyya, 1650 Heron Ave., Sunnyvale, Calif. 94087**

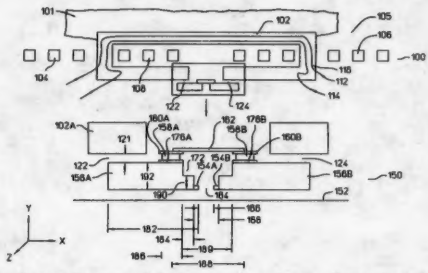
**Continuation of Ser. No. 146,255, Nov. 1, 1993, abandoned. This application Mar. 27, 1995, Ser. No. 410,382**

**Int. Cl.[6] G11B** *5/39;5/23*

**U.S. Cl. 360—113** **17 Claims**

1. A planar magnetic head for reading and writing information to a magnetic medium, the head comprising a gap structure coupled to a substrate, the structure comprising:

a first ferromagnetic lip adjacent to a head gap, the part of the lip facing the gap having a substantially flat surface with a thickness, the head gap having a gap length;




a first and a second ferromagnetic pole, the first pole being connected to the first lip, the first and second poles being separated by a distance greater than the gap length, and each pole having a thickness greater than the thickness of the lip; and

a Magnetoresistive element (MRE) connecting the first and second poles at a location where the first and second poles are separated by a distance greater than the gap length, the MRE being electrically isolated from the first and second poles;

wherein:

the first pole has a longitudinal axis that is substantially parallel to the medium when the head is reading and writing information to the medium;

the first lip extends from the first pole along the longitudinal axis;

the thickness of each pole is greater than the thickness of the lip along the direction that is substantially perpendicular to the longitudinal axis;

a current flows in the MRE along the direction substantially parallel to the longitudinal axis while the head reads information from the medium;

the lip, the gap, the first and second poles and the MRE are all formed on the substrate; and

the magnetic head is planar, with the lip, the gap length, the first and second poles and the MRE all being substantially parallel to the medium when the head is reading or writing information to the medium.

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**5,491,607**

## METHOD OF MODIFYING A DISK DRIVE FROM SERIAL TO PARALLEL OPERATION

**Phillip P. Bennett, Portola Valley, and Edwin E. Flores, San Bruno, both of Calif., assignors to Abekas Video Systems, Inc., Redwood City, Calif.**

**Continuation of Ser. No. 868,474, Apr. 14, 1992, abandoned. This application Aug. 23, 1994, Ser. No. 294,426**

**Int. Cl.[6] G11B** *23/02*

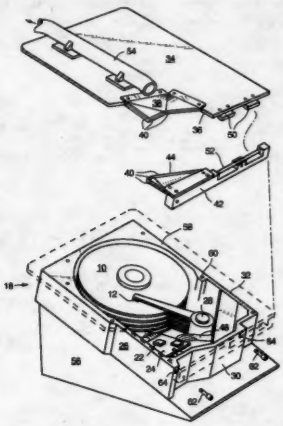
**U.S. Cl. 360—137** **6 Claims**

1. A method of modifying a disk drive, the disk drive having transducer heads that store and retrieve information to and from at least one platter located inside of a disk drive case having a removable cover which is hermetically sealed to the case, the method comprising the steps of:

removing the removable cover from the disk drive case;

securing a plate to the disk drive case, the plate having a shape conforming substantially to the shape of the removable cover for engaging with the disk drive case as a substitute for the removable cover, the plate having a cut-away section for exposing a portion of the interior of the disk drive case and a flange connected to the plate along the cut-away section which extends into the interior of the disk drive case, the plate being secured to the disk drive case by engaging a hinge pin that is attached to the disk drive case after the removable cover is removed;

vacuuming in the vicinity of the cut-away section of the plate to prevent contaminants from entering the interior of the disk drive case, the plate including a vacuum tube having an



opening located adjacent the cut-away section in order to perform such vacuuming;

disconnecting circuitry used to direct the information to and from the transducer heads in a serial fashion;

connecting circuitry that enables the information to be directed to and from the transducer heads in a parallel fashion;

removing the plate from the disk drive case; and

securing the removable cover to the disk drive case.

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**5,491,608**

**SHOCKPROOF AND PORTABLE DISK STORAGE APPARATUS HAVING SHOCK ABSORBERS ON ALL SIDES OF A HEAD/DISK ENCLOSURE AND A COPLANAR ELECTRONIC CARD**

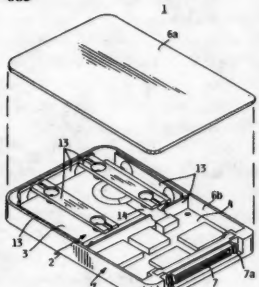
**Ichiroh Koyanagi, Yokohama; Makoto Ohtuki, Fujisawa; Fumitomo Ohsawa, Fujisawa, and Takayuki Satoh, Fujisawa, all of, Japan, assignors to International Business Machines Corporation, Armonk, N.Y.**

**Continuation of Ser. No. 306,559, Sep. 15, 1994, abandoned, which is a division of Ser. No. 58,597, May 7, 1993, Pat. No. 5,402,308. This application Jun. 7, 1995, Ser. No. 474,092**

**Claims priority, application Japan, May 12, 1992, 4-119087**

**Int. Cl.[6] G06F *1/16;* H05K *7/14***

**U.S. Cl. 361—685** **4 Claims**



1. A shockproof and portable disk storage apparatus comprising:

a portable outer case;

a head/disk enclosure positioned within the portable outer case, the head/disk enclosure having a plurality of sides;

an electronic card positioned within the portable outer case, the head/disk enclosure and electronic card being placed abreast on substantially the same plane, the head/disk enclosure and electronic card further being spaced apart thereby defining a gap; and

a plurality of shock absorbers configured to elastically support the head/disk enclosure within the portable outer case, wherein each side of the head/disk enclosure is supported by at least one shock absorber, further wherein at least one shock absorber is positioned within the gap thereby substantially physically isolating the head/disk enclosure and the electronic card.

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**5,491,609**

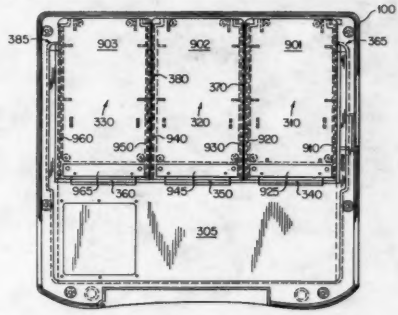
**PORTABLE ELECTRONIC PLATFORM SYSTEM**

**Scott Dankman, Reston, and Roc A. Lastinger, Springfield, both of Va., assignors to TelePad, Herndon, Va.**

**Filed Feb. 28, 1994, Ser. No. 202,491**

**Int. Cl.[6] G06F *1/16;* H05K *7/10***

**U.S. Cl. 361—686** **5 Claims**



2. A portable electronic platform system, comprising:

a plurality of rails on an exterior side of a portable electronic platform defining a plurality of bays, wherein at least two of the rails define one bay;

a first external module slidably connectable within the rails to at least one of the plurality of bays; and

a second external module slidably connectable within the rails to at least two of the plurality of bays.

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**5,491,610**

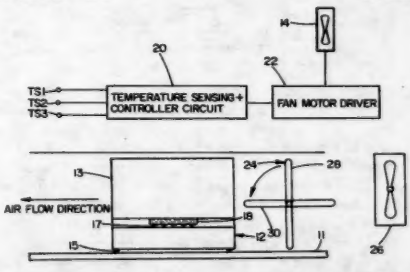
**ELECTRONIC PACKAGE HAVING ACTIVE MEANS TO MAINTAIN ITS OPERATING TEMPERATURE CONSTANT**

**Lawrence S.-W. Mok, Brewster; Sampath Purushothaman, Yorktown Heights; Bahgat G. Sammakia, Newark Valley; Janusz S. Wilczynski, Ossining, and Tien Y. Wu, Endwell, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed Sep. 9, 1994, Ser. No. 303,804**

**Int. Cl.[6] H05K *7/20***

**U.S. Cl. 361—695** **10 Claims**



1. An apparatus for actively cooling a semiconductor chip module comprising:

a semiconductor chip module secured to a printed circuit board;
a heat sink thermally secured to said module;
variable air flow means for directing air flow over said heat sink;
means for monitoring the temperature difference between the module and the printed current board; and
control means for connecting the means for monitoring the temperature difference between the module and the printed circuit board and the variable air flow means to regulate the air flow to maintain the temperature difference at a preset value.

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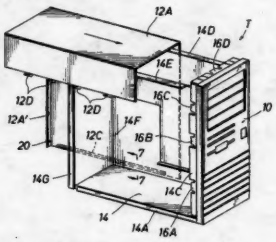
**5,491,611**

## ALIGNED QUICK CONNECT COVER FOR A COMPUTER SYSTEM

**Thomas K. Stewart, Spring, and Thomas T. Hardt, Missouri City, both of Tex., assignors to Compaq Computer Corporation, Houston, Tex.**

**Filed Sep. 10, 1993, Ser. No. 119,993**
**Int. Cl.[6] H05K** *1/14*
**U.S. Cl. 361—736** **28 Claims**




1. Apparatus adapted for use with a computer system comprising
a frame having a front end and a rear end;
a plurality of tabs being located adjacent said frame front end and extending rearwardly,
a cover having a front end, and
a plurality of slots formed by stamping said cover front end outwardly and folding back said cover front end so that said slots extend inwardly in said cover and are aligned to receive said plurality of tabs to attach said cover to said frame.

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**5,491,612**

## THREE-DIMENSIONAL MODULAR ASSEMBLY OF INTEGRATED CIRCUITS

**Earl R. Nicewarner, Jr., Gaithersburg, Md., assignor to Fairchild Space and Defense Corporation, Germantown, Md.**

**Filed Feb. 21, 1995, Ser. No. 393,922**
**Int. Cl.[6] H05K** *7/02*
**U.S. Cl. 361—760** **6 Claims**

1. An integrated circuit module assembly comprising a primary base substrate support member having two sides, two secondary base support members each having an inner and an outer side with one secondary base support member being located with the inner side thereof located adjacent to and in close proximity to one side of said primary base substrate support member and the other secondary base support member being located with the inner side thereof located adjacent to and in close proximity to the other side of said primary base substrate support member, at least one flip chip combination in a back to back relationship located between the inner side of said secondary base support members and the adjacent side of said primary base substrate support member, electrical connecting means for connecting at least one secondary base support member to said primary base substrate support member and wherein at least one of said base substrate support members is flexible.

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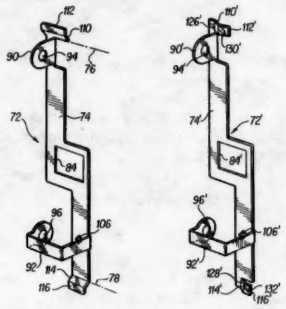
**5,491,613**

## ELECTRICAL CIRCUIT CARD WITH REDUCED EMI EMISSION

**Eric M. Petitpierre, Westminster, Md., assignor to Hubbell Incorporated, Orange, Conn.**

**Filed Jan. 31, 1994, Ser. No. 189,900**
**Int. Cl.[6] H05K** *7/14;9/00*
**U.S. Cl. 361—800** **20 Claims**

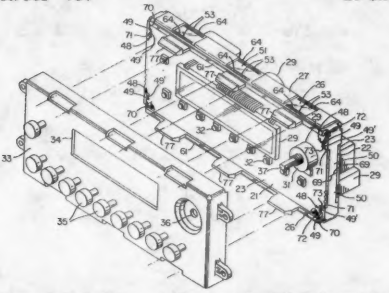



1. An electrical assembly characterized by reduced emission of electromagnetic interference, comprising:
a grounded, electrically conductive housing for receiving a plurality of removable circuit cards, said housing defining a horizontally extending front opening for receiving said circuit cards vertically in a side-by-side manner, said housing having upper and lower electrical contact surfaces immediately above and below said front opening, respectively; and
an electrical circuit card removably received in said housing, said circuit card comprising:
an insulative circuit board having front, rear and side edges and having electrical circuitry thereon;
an insulative faceplate coupled to said circuit board along the front edge thereof and adapted to lie generally vertically across said front opening of said housing when said circuit card is received in said housing, said faceplate having a rear surface facing said circuit board; and
an electrically conductive strip carried by at least one of said circuit board and said faceplate, said electrically conductive strip comprising an intermediate portion extending generally vertically along the rear surface of said faceplate, resilient upper and lower spring arms each extending rearwardly from said intermediate portion at an angle relative to said intermediate portion, and upper and lower contact pads at the ends of said respective upper and lower spring arms, said upper and lower contact pads forming planar contact areas which are each disposed at an angle relative to said respective upper and lower spring arms and are oriented parallel to the respective upper and lower electrical contact surfaces of said housing, said upper and lower contact pads being adapted to be brought into contact with said respective upper and lower contact surfaces of said housing when said circuit card is received in said housing.

## 5,491,614
## CONTROL DEVICE [illegible] METHOD OF MAKING THE [illegible]ME

Daniel L. Fowler, Kentwood, [illegible] William S. Hayes, Holland, both of Mich., assignors to Robertshaw Controls Company, Richmond, Va.

Division of Ser. No. 56,350, Apr. 30, 1993, Pat. No. 5,408,385.
This application Mar. 30, 1995, Ser. No. 413,590
Int. Cl.[6] H05K *1/14*
U.S. Cl. 361—784 20 Claims



1. In a control device comprising two circuit boards each having a component carrying side and an opposite solder side, each said circuit board having peripheral edge means, and mounting means holding said two circuit boards in spaced apart relation with certain sides thereof facing each other, the improvement wherein said mounting means comprises bracket means engaging and encircling said peripheral edge means of said two circuit boards so as to close the space between said two circuit boards around the entire said peripheral edge means thereof.

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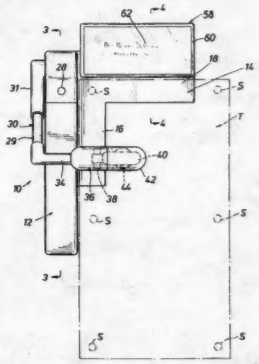
## 5,491,615
## LIGHT ATTACHMENT FOR A THERMOSTAT

Michael P. Nichols, 1401 33rd St. N., Texas City, Tex. 77590

Filed Jun. 27, 1994, Ser. No. 265,749
Int. Cl.[6] F21V *21/14*; G01D *11/28*
U.S. Cl. 362—23 12 Claims



1. A light attachment for illuminating a wall mounted thermostat having a mounting base secured to a wall, comprising:

a housing having a compartment to receive at least one battery and configured to position adjacent said thermostat;

a movable arm having a pivot end pivotally mounted to said housing and defining a free end;

a lamp mounted adjacent said free end of said moveable arm;

electrical circuitry, connected between said battery and said lamp for the selective supply of electrical energy to said lamp from said battery; said electrical circuitry including manually operable switch means to permit selectively the supply of electrical energy to said lamp for illuminating said lamp;

said movable arm being pivotally movable with said lamp to position said lamp at a desired position relative to said thermostat for illumination of a desired portion of said thermostat; and

said housing including a mounting flange extending from one side thereof and configured to position between the mounting base of the thermostat and the wall to be clamped against the wall by the mounting base of the thermostat so as to mount said housing alongside said thermostat.

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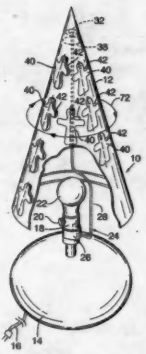
## 5,491,616
## HEAT INDUCED ROTATING LAMP SHADE

Patricia M. Reed, Portland, Oreg., assignor to Daisy Kingdom, Portland, Oreg.

Filed Jan. 13, 1994, Ser. No. 182,787
Int. Cl.[6] F21V *21/30*
U.S. Cl. 362—35 4 Claims



1. A heat induced rotatable lamp shade adapted to fit a shadeless lamp having an exposed light bulb fitted to a socket comprising:

a cone-shaped shade and support rod;

said cone-shaped shade having an apex tip portion provided with a bearing and said support rod having an end provided with a mated bearing for low friction rotation of the shade on said support rod;

said cone-shaped shade provided with discriminate openings forming unidirectional vanes whereby heat generated from the light bulb flows upwardly through said openings and against said vanes to produce rotation of said shade on said rod; and

said cone-shaped shade having an exterior decoration including multiple figures defining figure outlines, said openings provided by non-linear slits that define shade portions that are projected from the cone surface to produce the vanes, said slits provided along selected figure outlines to provide the figures with a three-dimensional appearance.

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## 5,491,617
## ILLUMINATED FLUID TAP

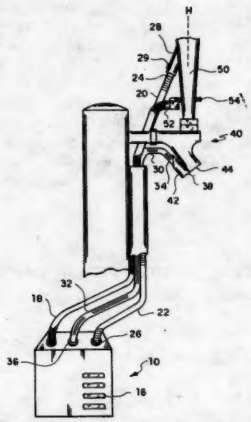
Joseph E. Currie, R.F.D. #8, 17 Lawrence Rd., Hudson, N.H. 03051

Continuation-in-part of Ser. No. 59,532, May 12, 1993, abandoned. This application Aug. 4, 1994, Ser. No. 284,976
Int. Cl.[6] F21V *33/00*
U.S. Cl. 362—96 17 Claims

1. An illumination device for a fluid-bearing tap having a fluid control handle and an outlet, said fluid illumination device comprising:

a light source including a first lamp and a second lamp;

a first light conduit connected to the tap, said first light conduit being illuminated by said first lamp;




a second light conduit connected to the outlet of the tap, said second light conduit being illuminated by said second lamp; and

a switch adjacent to the tap and communicating with said light source, said switch deactivating said first lamp and activating said second lamp when the tap is actuated;

wherein the tap is illuminated by said first light conduit when the tap is not actuated, and an area proximate to the outlet of the tap is illuminated by said second light conduit when the tap is actuated.

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**5,491,618**

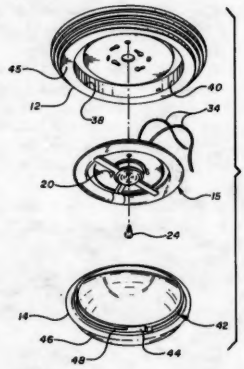
**LIGHT FIXTURE**

**Usman Vakil, Walnut, Calif., assignor to Lights of America, Inc., Walnut, Calif.**

**Filed Aug. 20, 1993, Ser. No. 110,299**

**Int. Cl.[6] F21S** *1/02*

**U.S. Cl. 362—147** **11 Claims**




1. A light fixture comprising:

a base plate fixably securable to at least one of a ceiling and a wall;

a light assembly including means for producing visible light, said light assembly including a flush mount surface; and

connecting means for removably securing said flush mount surface of said light assembly to said base plate in abutting facing relationship, said connecting means including first and second portions, the first portion including a plurality of projections and the second portion including a plurality of receptacles, wherein said plurality of projections slidably engage a corresponding plurality of said plurality of receptacles to removably secure said light assembly to said base plate and wherein said plurality of projections depend from said base plate and said plurality of receptacles are disposed in said light assembly.

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**5,491,619**

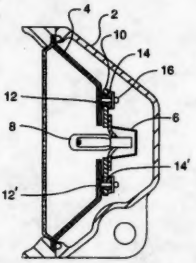
**VIBRATION AND SHOCK ISOLATED HEADLIGHT MOUNTING SYSTEM**

**Avtar S. Gill, Peoria, Ill., assignor to Caterpillar Inc., Peoria, Ill.**

**Filed Mar. 20, 1995, Ser. No. 406,436**

**Int. Cl.[6] F21V** *29/00*

**U.S. Cl. 362—294** **3 Claims**




1. In a headlight having a housing, a reflector, a bulb and a bulb holder, the improvement comprising:

a heat conducting metal element in intimate heat conducting contact with the bulb holder and extending outwardly from the bulb, said heat conducting element having a plurality of spaced apart openings extending therethrough;

a silicon rubber grommet positioned in the heat conducting metal element openings; and

means for connecting each of the grommets to the reflector with said heat conducting element being spaced from contact with said housing and reflector.

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**5,491,620**

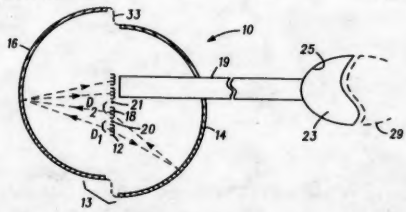
**LIGHT SOURCE ILLUMINATION SYSTEM**

**Roland Winston, Chicago, and Philip L. Gleckman, Oak Park, both of Ill., assignors to NiOptics Corporation, Evanston, Ill.**

**Continuation of Ser. No. 901,885, Jun. 22, 1992, abandoned. This application Nov. 18, 1994, Ser. No. 342,393**

**Int. Cl.[6] F21V** *8/00;7/02*

**U.S. Cl. 362—346** **20 Claims**




1. An illumination system, comprising:

a light source;

a first concave mirror imaging said light source at a first selected location;

a second concave mirror for reimaging said imaged light source at a second selected location, said first and second concave mirrors establishing interior confines and enabling removal of the light from within the confines of said first and second concave mirrors, said first and second concave mirrors further being separated by an imaginary plane therebetween and said

light source and said second selected location being disposed at least one of on the plane or on one side of the plane; and

means for collecting the light from said reimaged light source, said collection means passing through a surface of one of said concave mirrors enabling light removal without reimaging said light source outside the radius of curvature described by said concave mirrors.

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**5,491,621**

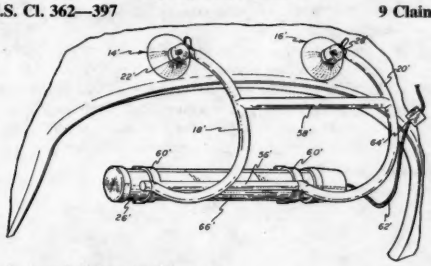
**SUCTION MOUNTED WORK LIGHT**

**Earl A. Duty, 1603 Holly Pl., Sidney, Ohio 45365**

**Continuation-in-part of Ser. No. 297,160, Aug. 29, 1994, Pat. No. 5,457,614. This application Jan. 12, 1995, Ser. No. 371,814**

**Int. Cl.[6] F21V** *21/08*

**U.S. Cl. 362—397** **9 Claims**



1. A work light comprising:

a first suction base member;

a second suction base member located in spaced relation to said first base member;

a first arm having a base end pivotally attached to said first base member and a cantilever end for receiving a light;

a second arm having a base end pivotally attached to said second base member and a cantilever end for receiving a light, said second base member being pivotable relative to said second arm independently of pivotal movement of said first base member relative to said first arm whereby mounting the work light on a surface is facilitated by providing at least two positive engagement points for the work light;

means supporting a work light in a cantilevered relationship relative to said first and second base members at said cantilever ends of said first and second arms; and

means wherein said first and second arms are pivotally movable simultaneously about said first and second base members when said base members are attached to a surface.

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**5,491,622**

**POWER CONVERTER WITH EMERGENCY OPERATING MODE FOR THREE PHASE INDUCTION MOTORS**

**Paul F. Carosa, Los Angeles, Calif., assignor to Delco Electronics Corp., Kokomo, Ind.**

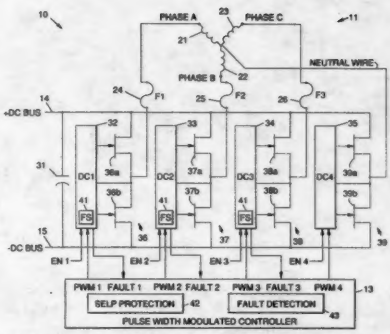
**Filed Jan. 7, 1994, Ser. No. 178,988**

**Int. Cl.[6] H02H** *7/122*

**U.S. Cl. 363—56** **10 Claims**

1. A power converter for use with a three-phase motor having a neutral wire, and wherein the power converter comprises a pulse width modulation controller that is coupled to three switching poles by means of individual drive circuits, which switching poles are respectively coupled to the winding of each phase of the motor and are separately controlled by the individual drive circuits, and wherein the switching poles are powered by first and second DC power busses coupled thereto, wherein the improvement comprises:

an emergency operation pole coupled between the controller and the neutral wire of the motor and which is coupled to the first and second DC power busses, and wherein the controller is configured to disable a failed one of the three switching poles,




and to control the emergency operation pole subsequent to disabling of the failed switching pole.

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**5,491,623**

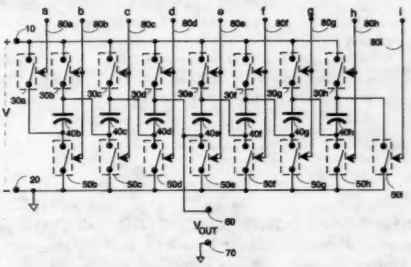
**VOLTAGE MULTIPLIER USING SWITCHED CAPACITANCE TECHNIQUE**

**Marinus J. Jansen, Enschede, Netherlands, assignor to Fluke Corporation, Everett, Wash.**

**Filed Sep. 23, 1994, Ser. No. 311,470**

**Int. Cl.[6] H02M** *7/42*

**U.S. Cl. 363—60** **5 Claims**



1. A voltage multiplier comprising:

(a) a plurality of capacitors disposed in an output ladder network having at least one tap, each capacitor having a sufficient amount of capacitance to substantially maintain a charge voltage over a period of an alternating current output waveform;

(b) a plurality of switches for selectably coupling each of said capacitors to an input voltage for a selected charging time wherein each of said capacitors is charged at least once during said period; and

(c) an output terminal coupled to said tap in said output ladder network to form said alternating current output waveform.

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**5,491,624**

**AC TO DC POWER CONVERSION SYSTEM**

**Alexander Levran, Los Angeles; Joseph M. Nowosielski, Laguna Hills; Giao M. Ton-That, Mission Viejo; Ramamoorthy Rajagopalan, Irvine, all of Calif., and Henri Mabboux, Eybens, France, assignors to Square D Company, Palatine, Ill.**

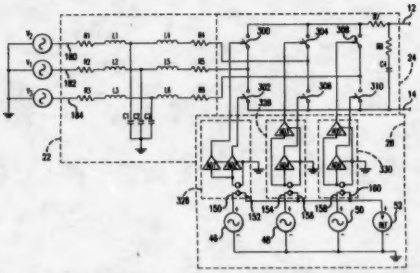
**Continuation of Ser. No. 84,552, Jun. 29, 1993, abandoned. This application Oct. 24, 1994, Ser. No. 328,975**

**Int. Cl.[6] H02M** *7/155*

**U.S. Cl. 363—87** **27 Claims**

1. An AC to DC power conversion circuit comprising:

a) at least one AC input line electrically connected to an external alternating current (AC) power source;



b) an impedance electrically connected to said AC input and having at least an input and an output, said input of said impedance electrically connected to said AC input;

c) a switching matrix electrically connected to said output of said impedance, said switching matrix having at least one pair of DC output lines, said switching matrix further including a switching matrix controller and at least one pair of switching elements, alternate members of said pair of switching elements selectively enabled by said switching matrix controller to couple said output of said impedance to said DC output lines;

d) a voltage feedback circuit coupled to said DC output lines and said switching matrix controller;

e) a voltage and phase detection means electrically connected to said AC input line; and

f) a first signal processing means coupled to said voltage and phase detection means and said voltage feedback circuit for determining whether more or less energy should be supplied to said DC output lines, said first signal processing means further including a voltage threshold circuit to prevent operation of said power conversion circuit if said AC input is outside predetermined threshold limits.

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**5,491,625**

**INFORMATION DISPLAY SYSTEM FOR ACTIVELY REDUNDANT COMPUTERIZED PROCESS CONTROL**

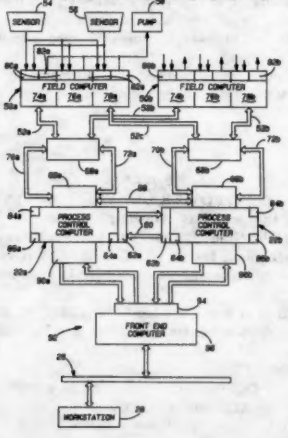
**Dana W. Pressnall, Midland; Jeffery T. Polishak, Saginaw; Bradley K. Felix; Michael J. Durisin, both of Midland, and Joseph Ellison, Detroit, all of Mich., assignors to The Dow Chemical Company, Midland, Mich.**

**Filed Dec. 23, 1993, Ser. No. 173,407**

**Int. Cl.[6] G05B** *15/00*

**U.S. Cl. 364—133** **29 Claims**

1. A computerized process control display system for conveying information to an operator about the state of a process under control, comprising:



first and second independently and concurrently operating redundant process control computers each having interface means for connection to a common point within the process under control and for concurrently monitoring a common parameter associated with said common point;

first and second process control programs running respectively on said first and second process control computers, the programs each having means for controlling the behavior of at least a portion of the process under control, said process control programs being capable of representation as a series of source statements wherein said source statements include at least one token to represent said common parameter;

a display computer coupled to said first and second process control computers for displaying at least a portion of said series of source statements comprising said process control programs;

said display computer further having data access and display means for obtaining and simultaneously displaying the common parameter value adjacent its token in said source statement from both first and second process control computers, whereby the operator is provided a means to simultaneously visually compare the common parameter values from said first and second process control computers.

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**5,491,626**

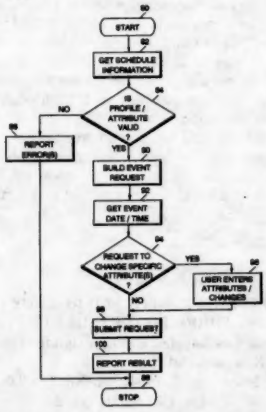
**METHOD AND APPARATUS FOR PROFILE TRANSPOSITION TO CALENDAR EVENTS**

**Marvin L. Williams, Lewisville, and Abdorelza Salahshour, Keller, both of Tex., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed Jun. 16, 1993, Ser. No. 78,668**

**Int. Cl.[6] G06F** *17/60*

**U.S. Cl. 364—401** **2 Claims**



1. A method of simplifying scheduling of a new event into a facility which requires attributes similar to those selected for a previously scheduled event using a computer system scheduling program, comprising the steps of:

providing a graphical object to represent a non-specific facility on the computer system;

associating at least one recurring and required attribute with said non-specific facility for display with said graphical object; and

directly manipulating said graphical object onto a scheduling program on the computer system in order to obtain a listing of available specific facilities matching said at least one recurring and required attribute, wherein a user may select one of said available specific facilities without manually entering

facility requirements each time an event is to be scheduled into a facility requiring similar attributes.

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**5,491,627**

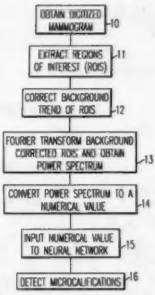
## METHOD AND SYSTEM FOR THE DETECTION OF MICROCALCIFICATIONS IN DIGITAL MAMMOGRAMS

**Wei Zhang, Chicago, and Kunio Doi, Willowbrook, both of Ill., assignors to Arch Development Corporation, Chicago, Ill.**

**Filed May 13, 1993, Ser. No. 60,531**

**Int. Cl.[6] A61B** *6/00*

**U.S. Cl. 364—413.2** **48 Claims**




1. A method of detecting microcalcifications in a digital mammogram, comprising:

obtaining a digital mammogram;

extracting regions of interest from said digital mammogram suspected of containing a microcalcification;

converting said regions of interest into corresponding numerical data;

inputting said numerical data to a shift-invariant neural network trained to detect microcalcifications for processing of said numerical data by said neural network, said neural network outputting corresponding output images;

detecting a microcalcification in said digital mammogram using said output images.

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**5,491,628**

## METHOD AND APPARATUS FOR DOCUMENT TRANSFORMATION BASED ON ATTRIBUTE GRAMMARS AND ATTRIBUTE COUPLINGS

**Toshiro Wakayama, Webster, N.Y.; Allen L. Brown, Jr., Solana Beach, Calif.; Suryanarayana M. Mantha, and An Feng, both of Webster, N.Y., assignors to Xerox Corporation, Stamford, Conn.**

**Filed Dec. 10, 1993, Ser. No. 165,785**

**Int. Cl.[6] G06F** *17/27*

**U.S. Cl. 364—419.08** **20 Claims**

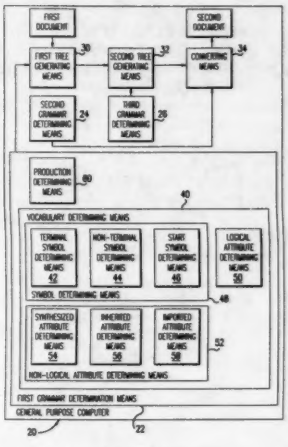
1. A method for converting a first document to a second document, the method comprising the steps of:

specifying the first document in terms of a first extended attribute grammar;

specifying the second document in terms of a second extended attribute grammar;

specifying an extended attribute coupling grammar of the first and second extended attribute grammars; and

transforming the first document into the second document based on the extended attribute coupling grammar.

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**5,491,629**

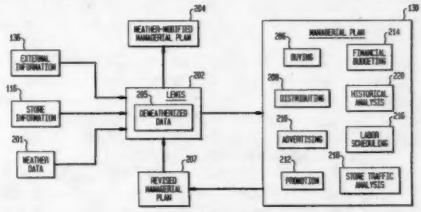
## SYSTEM AND METHOD FOR DETERMINING THE IMPACT OF WEATHER AND OTHER FACTORS ON MANAGERIAL PLANNING APPLICATIONS

**Frederick D. Fox, Philadelphia; Douglas R. Pearson, Wyomissing; Mike A. Rhoads, Mount Penn, and Peter A. Zaleski, Havertown, all of Pa., assignors to Strategic Weather Services, Wayne, Pa.**

**Filed Mar. 4, 1994, Ser. No. 205,494**

**Int. Cl.[6] G06F** *17/00*

**U.S. Cl. 364—420** **36 Claims**




1. A computer-based system for generating a weather-modified managerial plan that represents the future impact of weather and other factors on retail sales, comprising:

first means for providing store information;

second means for providing weather data, said weather data including,

historical weather data,

normal weather data, and

forecasted weather data;

third means for providing information external to retailer store environment;

database initializer means for performing one or more transformations of said store information, said weather data, and said external information to produce databases;

correlation processor means for generating a weather impact model, said weather impact model expressing a correlation between said store information and said external information contained within said databases with said historical weather data, and for substituting said normal weather data for said historical weather data in said weather impact model to generate deweatherized data; and

forecasting processor means for substituting said forecasted weather data for said normal weather data in said weather impact model to produce a weather-modified managerial plan.

## 5,491,630

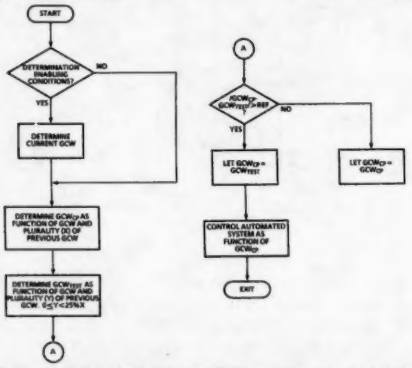
## METHOD/SYSTEM FOR RESETTING THE VALUE OF A CONTROL PARAMETER INDICATIVE OF GROSS COMBINED WEIGHT OF VEHICLES TO A DEFAULT VALUE THEREOF

**Thomas A. Genise, Dearborn, and Ronald K. Markyvech, Allen Park, both of Mich., assignors to Eaton Corporation, Cleveland, Ohio**

**Filed Aug. 3, 1994, Ser. No. 285,472**

**Int. Cl.**[6] **G06F** *19/00;* **G06G** *7/00;* **F16H** *59/48;59/30*

**U.S. Cl. 364—424.1** **19 Claims**


START
DETERMINATION ENABLING CONDITIONS?
NO
YES
DETERMINE CURRENT GCW
DETERMINE GCW$_{CP}$ AS FUNCTION OF GCW AND PLURALITY (X) OF PREVIOUS GCW
DETERMINE GCW$_{CP}$ AS FUNCTION OF GCW AND PLURALITY (Y) OF PREVIOUS GCW, 0≤Y<25%X
A
A
GCW$_{CP}$ > GCW$_{PREV}$ + REF
YES
NO
LET GCW$_{CP}$ = GCW$_{PREV}$
LET GCW$_{CP}$ = GCW$_{CP}$
CONTROL AUTOMATED SYSTEM AS FUNCTION OF GCW$_{CP}$
EXIT

1. A method for controlling a vehicle system on a vehicle having an expected gross combined weight ranging from a minimum expected value to a maximum expected value, said system including at least one actuator and a controller for receiving input signals and processing same according to predetermined logic rules to issue command output signals to said actuator, said method comprising:

(i) determining a value for a control parameter ($GCW_{CP}$) indicative of current vehicular gross combined weight for said vehicle by:

performing continuous determinations of current vehicular gross combined weight and a filtered average of a current and a plurality of previous determinations of current vehicular gross combined weight;

determining as a function of said expected gross combined weight a default value for said value;

determining at least one set of vehicle operating conditions deemed to be indicative of a change in vehicle loading;

sensing for an occurrence of said set of vehicle operating conditions; and

upon sensing the occurrence of said set of vehicle operating conditions, causing said value to be reset to the default value thereof; and

(ii) controlling said system as a function of said value.

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## 5,491,631

## FAULT DIAGNOSTIC SYSTEM FOR VEHICLES USING IDENTIFICATION AND PROGRAM CODES

**Yoshiyuki Shirane; Seiichi Iwasa; Yoshio Suzuki; Kiyoshi Kuramochi; Kazuo Kokubo; Tetsuya Ohno; Kimio Mizuno, and Takashi Satoh, all of Saitama, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan**

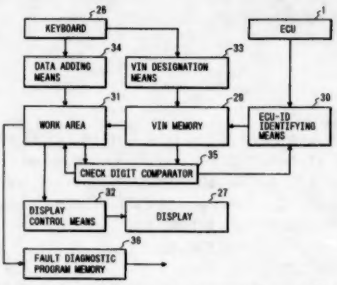
**Continuation of Ser. No. 988,443, Dec. 9, 1992, abandoned.**

**This application Oct. 21, 1994, Ser. No. 328,341**

**Claims priority, application Japan, Dec. 25, 1991, 3-357221; Dec. 25, 1991, 3-357222; Dec. 25, 1991, 3-357223; Dec. 25, 1991, 3-357224; Dec. 25, 1991, 3-357226; Dec. 25, 1991, 3-357227; Dec. 25, 1991, 3-357228; Dec. 25, 1991, 3-358180**

**Int. Cl.**[6] **G06G** *7/76;* **B60Q** *1/00;* **G01L** *3/26*

**U.S. Cl. 364—424.04** **10 Claims**




1. A fault diagnostic system for connection to a computer-aided electronic control unit carried on a vehicle for detecting and diagnosing faults in vehicle parts connected to said electronic control unit, said fault diagnostic system comprising:

means for providing a control unit identification code that identifies the type of electronic control unit that is being carried on the vehicle;

means for providing a vehicle identification code that identifies the type of vehicle on which the electronic control unit is being carried;

storage means for storing a plurality of diagnostic programs;

a priority table in which a fault code and diagnostic priority are assigned for an electronic control unit fault and for each faulty vehicle part respectively;

abnormality detecting means for detecting abnormality of said electronic control unit and vehicle parts and outputting a fault code corresponding to each abnormality;

means responsive to detection of a plurality of abnormalities for accessing said priority table using the plurality of fault codes output from said abnormality detecting means as retrieval keys, and displaying the fault codes corresponding to said abnormalities along with said priority; and

program selecting means jointly responsive to said control unit identification code, to said vehicle identification code, and to a fault code and priority selected by an operator from said display for retrieving one of said diagnostic programs from said storage means for use by said fault diagnostic system.

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## 5,491,632

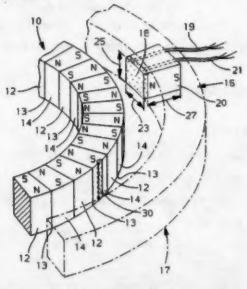
## ROTARY ENCODER WITH NEUTRAL POSITION

**Andrzej M. Pawlak; William C. Lin, both of Troy; David W. Graber, Millington; Dennis C. Eckhardt, Saginaw; Scott E. Weiss, Bay City; Maged Radamis, Mt. Morris; Thomas A. Perry, Washington, and John R. Bradley, Clarkston, all of Mich., assignors to General Motors Corporation, Detroit, Mich., and Delco Electronics Corporation, Kokomo, Ind.**

**Filed May 26, 1994, Ser. No. 249,409**

**Int. Cl.**[6] **B62D** *5/00*

**U.S. Cl. 364—424.05** **3 Claims**




1. An apparatus for detecting angular rotation and a neutral position of a rotary object, the neutral position corresponding to a predetermined angular position of the rotary object, the apparatus comprising:

an encoder wheel attached to the rotary object, the periphery of the encoder wheel having equally-sized alternating regions of N-pole and S-pole magnetization, one of the magnetized regions having a demagnetized portion;

a sensor located adjacent the periphery of the encoder wheel and generating a sinusoidal output signal responsive to passage of the magnetized regions as the encoder wheel is rotated, a period of the sinusoidal output signal corresponding to passage of two successive magnetic regions, passage of the demagnetized portion resulting in a signal irregularity;

means for detecting values of the sinusoidal output signal equal to a predetermined threshold voltage, each detected value corresponding to an incremental angular rotation of the rotary object; and

means for detecting the signal irregularity, the angular position of the rotary object when the signal irregularity is detected being the neutral position of the rotary object.

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**5,491,633**

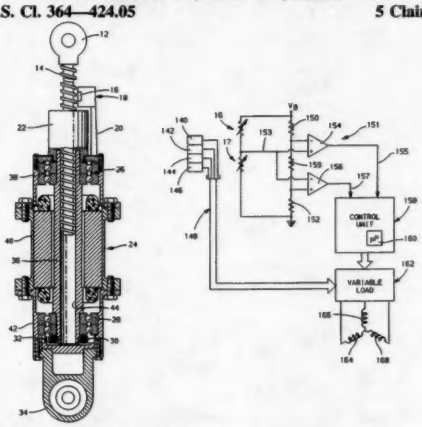
**POSITION SENSOR FOR ELECTROMECHANICAL SUSPENSION**

**Rassem R. Henry, Clinton Township; Bruno P. B. Lequesne, Troy, and Thaddeus Schroeder, Rochester Hills, all of Mich., assignors to General Motors Corporation, Detroit, Mich.**

**Continuation of Ser. No. 115,610, Sep. 3, 1993, abandoned, which is a continuation-in-part of Ser. No. 702,873, May 20, 1991, Pat. No. 5,276,621, Ser. No. 702,874, May 20, 1991, and Ser. No. 702,875, May 20, 1991. This application Feb. 17, 1995, Ser. No. 390,916**

**Int. Cl.[6] G06F** *7/700;* **G01B** *5/30;* **F16H** *27/02*

**U.S. Cl. 364—424.05** **5 Claims**



1. An apparatus comprising:

a rotating element;

a linearly moving element;

a rotary to linear converter coupled to the rotating element and the linearly moving element, wherein the rotary to linear converter translates linear movement of the linearly moving element to rotary movement of the rotating element;

means for determining relative movement of the rotating element;

first and second grooves in the linearly moving element, the first and second grooves separated azimuthally by a predetermined angle greater than zero and vertically by a predetermined distance;

first and second sensors separated azimuthally by the predetermined angle wherein the first sensor responds to proximity of the first groove and the second sensor responds to proximity of the second groove, wherein the first and second sensors are coupled in a bridge comprising means for providing an output signal having (a) a first state when neither the first nor the second groove is proximate to either the first or the second sensor, (b) a second state when the first groove is proximate to the first sensor, and (c) a third state when the second groove is proximate to the second sensor.

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**5,491,634**

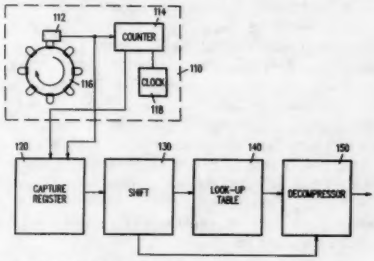
**ANTI-LOCK BRAKING SYSTEM CONTAINING LOOK-UP TABLE FOR DETERMINING WHEEL VELOCITY AND ACCELERATION**

**Roger L. Miller, San Jose, and Thomas P. Harper, Sunnyvale, both of Calif., assignors to National Semiconductor Corporation, Santa Clara, Calif.**

**Division of Ser. No. 191,564, Feb. 2, 1994. This application Oct. 6, 1994, Ser. No. 319,206**

**Int. Cl.[6] B60T** *17/00*

**U.S. Cl. 364—426.02** **8 Claims**




1. An anti-lock braking system comprising;

a mechanism for releasing a brake on a wheel; and

an electronic System Coupled to the mechanism, wherein the electronic system senses velocity of the wheel and controls when the mechanism to releases the brake to prevent locking, the electronic system comprising:

a motion sensor adapted to measure a time required for the wheel to move a fixed distance and generate a first signal indicating a fixed point representation of the time;

a shift circuit coupled to receive the first signal, wherein the shift circuit shifts the first signal to generate a second signal which indicates a factor;

a look-up table memory coupled to receive the second signal from the shift circuit and generate a data signal indicating a value which is stored in the look-up table memory, at an address indicated by the second signal, the value indicating a multiplicative inverse of the factor indicated by the second signal; and

a decompressor coupled to receive the data signal from the look-up table memory, wherein the decompressor converts the data signal to a signal indicating the velocity of the wheel.

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**5,491,635**

**ARRANGEMENT AND A PROCESS FOR CONTROLLING A STARTING DEVICE OF A VEHICLE DRIVE**

**Tamás Foeldi, Enzersdorf, Austria; Heinz Stehle, Weissach, Germany; Udo Heim, Leonberg, Germany; Hai T. Xuan, Korntal-Muenchingen, Germany, and Rainer Wuest, Wiernsheim, Germany, assignors to Dr. Ing. h.c.F. Porsche AG, Weissach, Germany**

**Filed Aug. 10, 1994, Ser. No. 288,060**

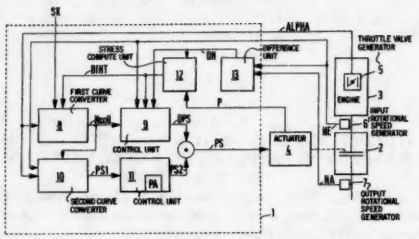
**Claims priority, application Germany, Aug. 10, 1993, 43 26 783.1; Dec. 16, 1993, 43 42 945.9**

**Int. Cl.[6] G06F** *19/00*

**U.S. Cl. 364—431.1** **18 Claims**

1. Process for controlling a starting of a motor vehicle drive that has a driving engine and a starting device, comprising the steps of:

using quantities such as a position of a power control element of the driving engine, an input rotational speed of the starting device, and an output rotational speed of the starting device; and




carrying out in two phases a starting operation for the motor vehicle using a control arrangement, said phases including a first phase forming a first command variable signal input to a first control unit supplying a first actuating signal for controlling an actuator for the starting device in order to vary the input and output rotational speeds, in which during said first phase the input rotational speed generated from an input rotational speed generator coupled to the starting device is led to a desired rotational speed determined by a first characteristic curve converter, and a subsequent second phase forming a second command variable signal input to said first control unit supplying the first actuating signal for controlling the actuator for the starting device, in which during said second phase a rotational speed difference signal formed in a difference forming unit from the difference between the input rotational speed and the output rotational speed is led along a desired course to a zero value.

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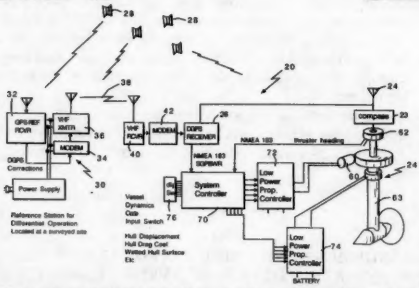
**5,491,636**

## ANCHORLESS BOAT POSITIONING EMPLOYING GLOBAL POSITIONING SYSTEM

**Glen E. Robertson, 1304 S. Orange Ave., Sarasota, Fla. 34239, and John L. Webster, Huntsville, Ala., assignors to Glen E. Robertson, Sarasota, Fla.**

**Filed Apr. 19, 1994, Ser. No. 229,512**
**Int. Cl.**[6] **G06F** *165/00;* **B63H** *21/22*
**U.S. Cl. 364—432** **12 Claims**




1. A system for substantially maintaining the position of a boat at an anchoring location in water selected by an operator of the boat, the system comprising:

at least one thruster, attached to a vertical shaft mounted to the boat and driven by a power source, for moving the boat to the selected anchoring location within the water;

a DGPS capable receiver located on-board the boat for receiving signals from GPS satellites and differential correction signals from another source, the DGPS capable receiver providing position information signals indicative of the position of the thruster in a differential GPS mode of operation based on said signals from the GPS satellites and the differential correction signal source,

a digital solid state compass for providing current heading indication signals representative of the heading of the thruster at less than about one second intervals;

said DGPS capable receiver generating range, bearing, magnitude and rate of change in range information at about one second intervals or faster on the basis of the difference between the selected position and present position of the thruster,

a controller providing control signals to the thruster for steering and propelling the boat to the selected anchoring location, the control signals related to the range, bearing, magnitude and rate of change in range information, said control signals including a variable thrust signal whose magnitude is dependent on the direction, magnitude and rate of change in range; and

a slip-ring assembly for allowing the thruster to rotate unrestricted multiple revolutions and without limit about the axis of the shaft while maintaining electrical connection between the thruster and the power source.

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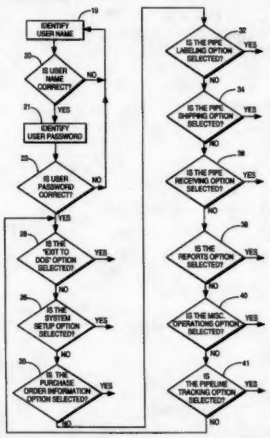
**5,491,637**

## METHOD OF CREATING A COMPREHENSIVE MANUFACTURING, SHIPPING AND LOCATION HISTORY FOR PIPE JOINTS

**Mark S. Kraemer, and James A. Ratliff, both of Katy, Tex., assignors to Amoco Corporation, Chicago, Ill.**

**Filed Mar. 18, 1994, Ser. No. 215,497**
**Int. Cl.**[6] **G06F** *17/60;* **F16L** *55/00*
**U.S. Cl. 364—468** **3 Claims**


IDENTIFY USER NAME
IS USER NAME CORRECT?
IDENTIFY USER PASSWORD
IS USER PASSWORD CORRECT?
IS THE "EXIT TO DOS" OPTION SELECTED?
IS THE SYSTEM SETUP OPTION SELECTED?
IS THE PURCHASE ORDER INFORMATION OPTION SELECTED?
IS THE PIPE LABELING OPTION SELECTED?
IS THE PIPE SHIPPING OPTION SELECTED?
IS THE PIPE RECEIVING OPTION SELECTED?
IS THE REPORTS OPTION SELECTED?
IS THE MISC. OPERATIONS OPTION SELECTED?
IS THE PIPELINE TRACKING OPTION SELECTED?

1. A method for creating an historical record for a plurality of pipes joints by use of a bar code reader coupled to a computer, said historical record comprising an information record for each one of said plurality of pipe joints, each of said information records having at least two portions, a first portion of each of said information records comprising selected physical characteristics of one of said plurality of pipe joints and a second portion of each of said information records comprising an exact location of one of said plurality of pipe joiners in a pipeline, said method comprising the steps of:

(a) recording a heat number associated with one of said plurality of pipe joints;

(b) recording a coil number associated with one of said plurality of pipe joints;

(c) recording a joint number associated with one of said plurality of pipe joints;

(d) creating a bar code label containing at least said heat number, said coil number and said joint number for one of said plurality of pipe joints;

(e) attaching said bar code label to the corresponding one of said plurality of pipe joints;

(f) repeating steps (a) through (e) for each of said plurality of pipe joints;

(g) transporting each one of said plurality of pipe joints to a final destination in pipeline having a corresponding exact location address;

(h) scanning each one of said bar code labels with said bar code reader to compile said heat number, said coil number, and said joint number to form said first portion of said information on record for each corresponding one of said plurality of pipe joint;

(i) storing said first portion of said information record for each one of said plurality of pipe joints in a memory of said computer;

(j) permanently removing each one of said bar code labels from the corresponding one of said plurality of pipe joints;

(k) inputting into said computer said exact location address in said pipeline for each one of said plurality of pipe joints to form said second portion of said information record for each corresponding one of said plurality of pipe joints; and

(l) storing said second portion of said information record for each on of said plurality of pipes joints in a memory of said computer.

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**5,491,638**

## METHOD OF CONTROLLING A COORDINATE MEASURING APPARATUS

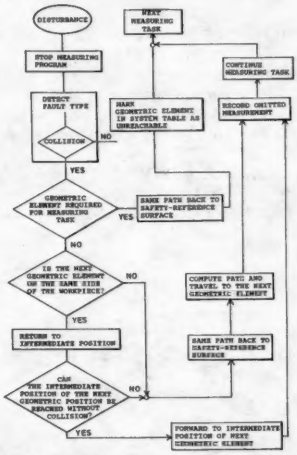
**Bernd Georgi, Oberkochen; Bernd Czepan, Heidenheim, and Heinz Peter, Ulm, all of, Germany, assignors to Carl-Zeiss-Stiftung, Heidenheim, Germany**

**Filed Oct. 26, 1994, Ser. No. 329,302**

**Claims priority, application Germany, Jan. 28, 1993, 43 36 863.8**

**Int. Cl.[6] G01B** *21/04;* **G05B** *19/401*

**U.S. Cl. 364—474.37** **7 Claims**


DISTURBANCE
NEXT MEASURING TASK
STOP MEASURING PROGRAM
CONTINUE MEASURING TASK
DETECT FAULT TYPE
MARK GEOMETRIC ELEMENT IN SYSTEM TABLE AS UNREACHABLE
RECORD OMITTED MEASUREMENT
COLLISION
NO
YES
GEOMETRIC ELEMENT REQUIRED FOR MEASURING TASK
TAKE PATH BACK TO SAFETY-REFERENCE SURFACE
YES
NO
IS THE NEXT GEOMETRIC ELEMENT ON THE SAME SIDE OF THE WORKPIECE?
NO
COMPUTE PATH AND TRAVEL TO THE NEXT GEOMETRIC ELEMENT
YES
RETURN TO INTERMEDIATE POSITION
TAKE PATH BACK TO SAFETY-REFERENCE SURFACE
CAN THE INTERMEDIATE POSITION OF THE NEXT GEOMETRIC POSITION BE REACHED WITHOUT COLLISION?
NO
YES
FORWARD TO INTERMEDIATE POSITION OF NEXT GEOMETRIC ELEMENT

1. A method of controlling a coordinate measuring apparatus for making measurements on a workpiece utilizing a probe, the workpiece having a plurality of geometric elements on first and second sides thereof and the apparatus having a fault-handling device for interrupting a measuring sequence in the case of a disturbance and for resuming the measurement sequence in a modified form, the method comprising the steps of:

coupling a control module to said fault-handling device;

placing predefined safety-reference surfaces about the workpiece;

automatically generating a travel path with said control module for said probe between said geometric elements utilizing said safety-reference surfaces; and,

at least always automatically computing in said control module collision-free connecting paths on said safety-reference surfaces from one geometric element on said first side to a next one of said geometric elements when said next geometric element is on said second side of said workpiece.

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**5,491,639**

## PROCEDURE FOR VERIFYING DATA-PROCESSING SYSTEMS

**Thomas Filkorn, Munich, Germany, assignor to Siemens Aktiengesellschaft, Munich, Germany**

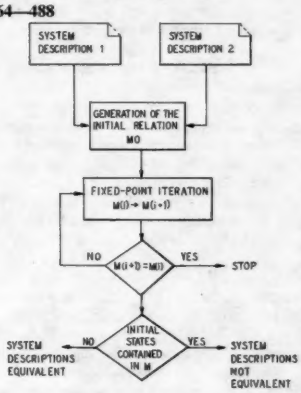
**PCT No. PCT/EP92/00789, § 371 Date Oct. 14, 1993, § 102(e) Date Oct. 14, 1993, PCT Pub. No. WO92/18944, PCT Pub. Date Oct. 29, 1992**

**PCT Filed Apr. 7, 1992, Ser. No. 133,208**

**Claims priority, application Germany, Apr. 17, 1991, 91106157.0**

**Int. Cl.[6] H03K** *19/00*

**U.S. Cl. 364—488** **8 Claims**




1. A method for verifying data-processing systems, comprising the steps of:

a) representing two descriptions, generated independently of one another, of a system to be verified as Mealy automata and comparing the two descriptions to one another;

b) carrying out the comparison with a fixed-point iteration procedure which initially generates a first set of all state pairs which generate at least one different output value for at least one set of input values, and which iteratively extends said first set by a second set of all state pairs which, in a finite number of steps of the two Mealy automata, lead to a state pair which belongs to the first set, until a fixed-point set of all non-equivalent state pairs is generated, the two Mealy automata being equivalent when their initial states or the state pairs formed from these states do not belong to the fixed-point set;

c) representing equivalence relations between states, output and transition functions of the two Mealy automata by binary decision diagrams; and

d) applying in each step of the fixed-point iteration, only boolean operations and substitutions to binary decision diagrams.

**5,491,640**

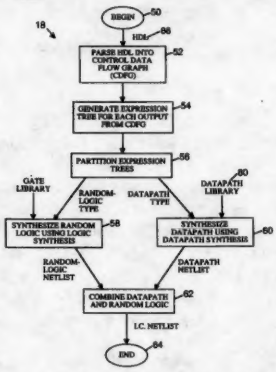
## METHOD AND APPARATUS FOR SYNTHESIZING DATAPATHS FOR INTEGRATED CIRCUIT DESIGN AND FABRICATION

**Balmukund K. Sharma, Santa Clara, and Mossaddeq Mahmood, San Jose, both of Calif., assignors to VLSI Technology, Inc., San Jose, Calif.**

**Continuation-in-part of Ser. No. 877,951, May 1, 1992, abandoned. This application Jul. 8, 1994, Ser. No. 272,205**

**Int. Cl.[6] G06F** *15/60*

**U.S. Cl. 364—488** **21 Claims**




1. A method for fabricating an integrated circuit comprising:

developing a set of circuit specifications for an integrated circuit;

encoding said set of circuit specifications in a hardware description language and inputting said hardware description language into a digital computer;

providing a datapath library including both sequential components and combinational components, wherein said sequential components exhibit sequential logic having an output dependent on inputs and also dependent on a state of a memory unit included within said sequential component, and wherein said combinational components exhibit combinational logic having an output only dependent on inputs to said combinational logic;

synthesizing from said hardware description language and on said computer a netlist including a sequential component selected from said datapath library, said synthesizing step including generating IC expression trees from said hardware description language and synthesizing said netlist utilizing said IC expression trees and said datapath library; and

fabricating the integrated circuit as specified by said netlist.

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**5,491,641**

## TOWARDS OPTICAL STEINER TREE ROUTING IN THE PRESENCE OF RECTILINEAR OBSTACLES

**Ranko Scepanovic, Cupertino, and Cheng-Liang Ding, San Jose, both of Calif., assignors to LSI Logic Corporation, Milpitas, Calif.**

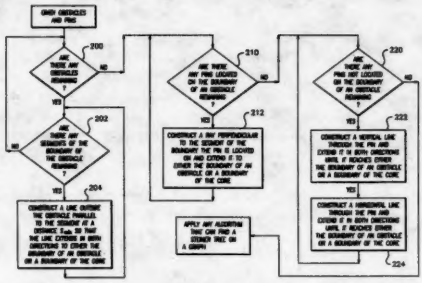
**Filed Oct. 4, 1993, Ser. No. 131,770**

**Int. Cl.[6] G06F** *17/50;15/00*

**U.S. Cl. 364—491** **4 Claims**

1. An apparatus for constructing an approximate Minimum Rectilinear Steiner Tree (MRST) which constitutes an interconnective routing path for a net of pins on edges of rectilinear components of an integrated circuit such that said routing path extends between said components, comprising:

first processing means for constructing an escape graph for said net in accordance with locations of said components, wherein said escape graph includes points which are formed by the intersection of lines from said pins and said edges of said components; and




second processing means for constructing said approximate MRST, the second processor comprising:

third processing means for constructing Voronoi regions in said escape graph; and for constructing a first graph including said pins, and edges connecting two of said pins respectively in said escape graph which extend between adjacent Voronoi regions;

fourth processing means for constructing a second graph as a minimum spanning tree of said first graph;

fifth processing means for constructing a third graph as a subgraph of said second graph including shortest paths in said escape graph corresponding to edges in said second graph;

sixth processing means for constructing a fourth graph as a minimum spanning tree of said third graph; and

seventh processing means for constructing said approximate MRST from said fourth graph by deleting said points which constitute end points in said fourth graph and do not correspond to said pins.

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**5,491,642**

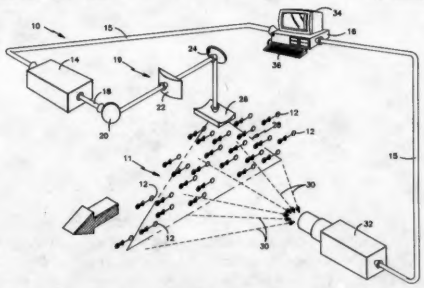
## CCD BASED PARTICLE IMAGE DIRECTION AND ZERO VELOCITY RESOLVER

**Dean C. Wormell, Westford; Fred R. Huettig, Boston; Andrew J. Jankevics, Acton, all of Mass.; Michael Winter, New Haven, Conn., and James L. Sopchak, Arlington, Mass., assignors to United Technologies Corporation, Hartford, Conn.**

**Filed Dec. 3, 1993, Ser. No. 162,507**

**Int. Cl.[6] G01P** *5/18*

**U.S. Cl. 364—509** **13 Claims**




1. Apparatus for reporting the magnitude and direction of fluid velocities in a flowing fluid having light reflective particles disposed therein, comprising:

light source means, for providing light pulses to periodically illuminate the light reflective particles at the pulse repetition rate of a gate signal presented thereto, to provide an optical speckle pattern image representative of the spatial position of the particles in the flowing fluid in each of two successive time intervals which are spaced in time by an interpulse period;

video recording means, having an array with a receiving surface for receiving each said optical speckle pattern image at a point of incidence thereon and for recording each received optical speckle pattern image as a corresponding electrical signal pattern, said video recording means shifting each said electrical signal pattern in said interpulse period from said point of incidence to a second position on said array major surface which is displaced from said point of incidence by a spatial increment whose value is determined by the magnitude of a bias displacement signal presented thereto; and

signal processor means, responsive to said light source means and to said recording means, and having keyboard means responsive to operator control, for providing said gate signal to said light source means and for providing said bias displacement signal to said video recording means, respectively, at a pulse repetition rate and bias magnitude selected by an operator to shift said recorded electrical signal pattern by a known velocity bias value in said interpulse period.

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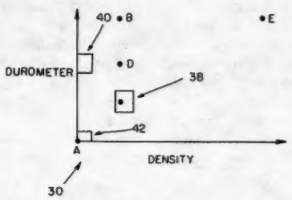
**5,491,643**

## METHOD FOR OPTIMIZING PARAMETERS CHARACTERISTIC OF AN OBJECT DEVELOPED IN A RAPID PROTOTYPING SYSTEM

**John S. Batchelder, Somers, N.Y., assignor to Stratasys, Inc., Eden Prairie, Minn.**

**Filed Feb. 4, 1994, Ser. No. 191,906**
**Int. Cl.[6] G06F *17/17*; G06T *17/30***
**U.S. Cl. 364—512** **10 Claims**




1. A method suitable for optimizing parameters which are characteristic of a preselected portion of an object comprising composites of different homogenous materials developed in a material extrusion system, which method comprises the steps of:

(1) identifying an object characteristic space comprising at least one dimension, the or each dimension defining a continuum represented by gradations of a single measurable property for one object parameter; and

(2) selecting a predetermined subset of said object characteristic space comprising desired optimal characteristics of the preselected portion of the object; so that when an object is fabricated by extrusion, it comprises the desired optimal characteristics.

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**5,491,644**

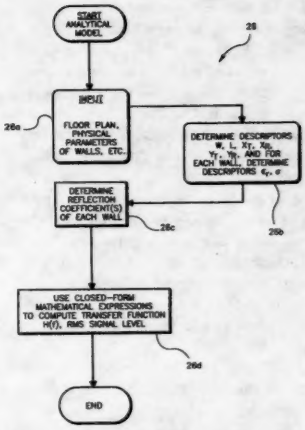
## CELL ENGINEERING TOOL AND METHODS

**Leslie W. Pickering, Atlanta; Eric N. Barnhart, Lawrenceville; Bruce A. Harvey, Norcross, and Michael L. Witten, Decatur, all of Ga., assignors to Georgia Tech Research Corporation, Atlanta, Ga.**

**Filed Sep. 7, 1993, Ser. No. 116,887**
**Int. Cl.[6] H05G *1/26***
**U.S. Cl. 364—514 R** **2 Claims**

2. A computer-based cellular engineering tool for determining wireless communications transfer characteristics between a transmitter location and receiver location within and around an architectural structure from architectural data, wall material parameters, and said transmitter and receiver locations, comprising:

user interface means for receiving input data and for displaying said transfer characteristics;


START ANALYTICAL MODEL
28
INPUT
26a
FLOOR PLAN, PHYSICAL PARAMETERS OF WALLS, ETC.
DETERMINE DESCRIPTORS W, L, $X_T$, $X_R$, $Y_T$, $Y_R$, AND FOR EACH WALL, DETERMINE DESCRIPTORS $\epsilon_r$, $\sigma$
DETERMINE REFLECTION COEFFICIENT(S) OF EACH WALL
26c
26b
USE CLOSED-FORM MATHEMATICAL EXPRESSIONS TO COMPUTE TRANSFER FUNCTION H(f), RMS SIGNAL LEVEL
26d
END

means for determining from said inputs a floor plan, said transmitter location and said receiver location within said floor plan, with respect to relative permittivity and conductivity values of walls within said floor plan; and

analysis means for determining a transfer characteristic for a communication channel between said transmitter and receiver locations by mathematically combining said transmitter location, said receiver location, said relative permittivity values and said conductivity values; and

means for graphically displaying said transfer characteristic.

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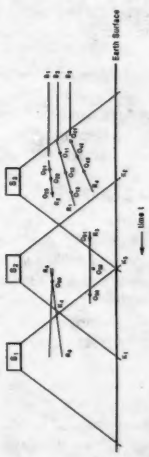
**5,491,645**

## METHOD AND SYSTEM FOR N-TRACK CORRELATION

**Eugene T. Kennedy, and Neils H. Hansen, both of Longmont, Colo., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed Oct. 13, 1993, Ser. No. 136,177**
**Int. Cl.[6] G01S *13/72***
**U.S. Cl. 364—516** **8 Claims**




1. In a tracking system, comprised of a plurality of satellite tracking stations orbiting above the surface of the earth, operatively connected to a data processing system, a computer method for tracking a plurality of targets, comprising the steps of:

receiving a first plurality of returns from said plurality of satellite tracking stations and using said first plurality of returns to

create a plurality of base tracks, each return of said first plurality of returns having an associated time, and each of said base tracks having an associated set of returns;

receiving a second plurality of returns from said plurality of satellite tracking stations and using said second plurality of returns to create a first plurality of resulting tracks, each return of said second plurality of returns having an associated time, and each of said resulting tracks having an associated set of returns;

creating a set of first pairs, each of said first pairs comprised of a first resulting track selected from said first plurality of resulting tracks and an associated first base track selected from said plurality of base tracks, where said first resulting track and said associated first base track have at least one common return;

correlating each of said first resulting tracks with said associated first base track;

removing said correlated first resulting tracks from said first plurality of resulting tracks creating a second plurality of resulting tracks;

creating a set of second pairs, each of said second pairs comprised of a second resulting track selected from said second plurality of resulting tracks and an associated second base track selected from said plurality of base tracks, where said second resulting track and said associated second base track have at least one satellite in common;

for each second pair, calculating an associated time gap where said gap measures the maximum length of time between the time associated with a return from said second resulting track and said time associated with a return from said second base track;

removing from said set of second pair second each second pairs having an associated time gap greater than a first specified value, creating a remaining set of second pairs;

calculating a goodness-of-fit score for each pair in said remaining set of second pairs;

removing from said set of second pairs each second pair having a goodness-of-fit score greater than a second specified value;

correlating each of said second resulting tracks remaining in said set of second pairs with said associated second base track;

removing said correlated second resulting tracks from said second plurality of resulting tracks creating a third plurality of resulting tracks;

creating a set of third pairs, each of said third pairs comprised of a third resulting track selected from said third plurality of resulting tracks and an associated third base track selected from said plurality of base tracks, where said third resulting track and said associated third base track have no satellite in common;

calculating a goodness-of-fit score for each pair in said set of third pairs;

removing from said set of third pairs each third pair having a goodness-of-fit score greater than a third specified value;

correlating each of said third resulting tracks remaining in said set of third pairs with said associated third base track;

removing said correlated third resulting tracks from said third plurality of resulting tracks creating a fourth plurality of resulting tracks;

creating a set of fourth pairs, each of said fourth pairs comprised of a fourth resulting track and a fourth base track, said fourth pairs created by pairing each of said fourth plurality of resulting tracks with each of said plurality of base tracks;

using profile dependent piece correlation to correlate said fourth resulting track with said fourth base track and calculating a goodness-of-fit score for each of said fourth pairs;

if said goodness-of-fit score for a fourth pair is greater than a fourth specified value, including said fourth resulting in said plurality of base tracks.

**5,491,646**

## PRODUCTION OF ANAGLYPHS

**Stephen P. E. Erskine, Benjy's Cottage, Uffington, Oxfordshire, SN7 7RB, England**

**Filed Nov. 20, 1992, Ser. No. 982,672**

**Claims priority, application United Kingdom, Nov. 20, 1991, 9124613**

**Int. Cl.**[6] **G02B** *27/02*

**U.S. Cl. 364—526** **14 Claims**

1. A method for producing an anaglyph, the method including the steps of:

producing a first digital image colour record representing a first image of a stereo pair of images;

producing a second digital image colour record representing a second image of said stereo pair of images;

each digital image colour record including a series of colour numbers representing the colours respectively of an array of visible individual coloured pixels into which the respective image is divided;

said first digital image colour record having at least two colour numbers for each pixel of the first image, said two colour numbers representing the proportions respectively of first and second image colours in the colour of the respective pixel;

said second digital image colour record having at least one colour number for each pixel of the second image, said one colour number representing the proportion of a third image colour in the colour of the respective pixel;

combining said first digital image colour record with said second digital image colour record, to produce a single anaglyph digital colour record, by mathematically processing the colour numbers of the first and second image records respectively in a manner to derive a third series of colour numbers, said third series of colour numbers constituting said single anaglyph digital colour record and representing the colours respectively of an array of visible individual coloured pixels defining an anaglyph;

said single anaglyph digital colour record having at least three colour numbers for each pixel of the anaglyph, said three colour numbers representing the proportions respectively of first, second and third anaglyph colours in the colour of the respective pixel.

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**5,491,647**

## METHOD AND APPARATUS FOR CONTROLLING A PRESS

**Michael J. O'Brien, Carrollton; Robert M. Carabbio, Highland Village; Bill Hemsath; Kevin D. Knussmann, both of Carrollton, and Thomas C. Robbins, Dallas, all of Tex., assignors to Signature Technologies, Inc., Carrollton, Tex.**

**Continuation of Ser. No. 195,490, Feb. 14, 1994, abandoned, which is a continuation of Ser. No. 817,691, Jan. 7, 1992, abandoned. This application Oct. 7, 1994, Ser. No. 320,837**

**Int. Cl.**[6] **B30B** *15/26;* **G06F** *19/00*

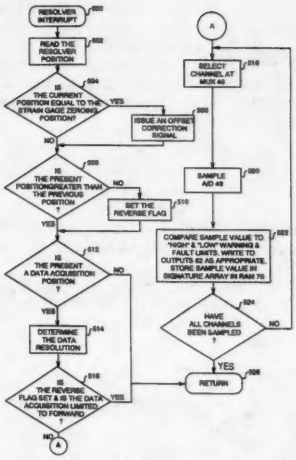
**U.S. Cl. 364—551.02** **1 Claim**

1. A press controller, where the press includes a tool, a mechanism for moving the tool through a cycle, a sensor coupled to the press, and a position transducer coupled to the press, where the sensor produces a first signal representative of the forces applied by the press to the tool and the transducer produces a second signal representative of the position of the tool, the press controller comprising:

a monitoring circuit, couplable to the sensor and transducer, which samples the first and second signals to produce first values and position values respectively;

a memory disposed to store predefined sets of tool positions within the cycle and force limit data associated with each tool position; and

a processor coupled to the monitoring circuit, press and memory, the processor being disposed to compare the sampled position value to the tool positions, determine the tool position corresponding to the position value, and compare the first values to the force limit data associated with the tool position, said




processor controlling said press in response to said comparisons, where force limit data associated with each tool position includes a high band value and a low band value, the processor, during a plurality of data gathering cycles, being disposed to:

store each first value in the memory in reference to the associated tool position during the first of the data gathering cycles as the high band value and the low band value associated with the tool position;

compare each first value to the high and low band values associated with the tool positions, and replace the high band value with the first value when the first value is greater than the high band value and replace the low band value with the first value when the first value is less than the low band value, for each data gathering cycle subsequent to the first data gathering cycle; and

read the high and low band values associated with one tool position, the M tool positions before the one tool position and the K tool positions after the one tool position, where the greatest high band value is stored in the memory as a high limit value associated with the one tool position and the lowest low band value is stored in the memory as a low limit value associated with the one tool position.

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**5,491,648**

## ULTRASONIC MEASURING SYSTEM

**Keiji Kuzuya, Kariya; Naoji Nakahara, Nagoya, and Yasuyuki Aoki, Owariasahi, all of, Japan, assignors to Aisin Seiki Kabushiki Kaisha, Kariya City, Japan**

**Filed Jan. 28, 1994, Ser. No. 187,507**

**Claims priority, application Japan, Jan. 29, 1993, 5-014246**

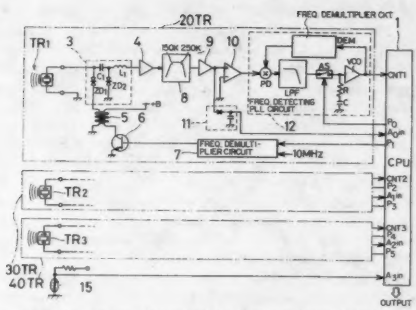
**Int. Cl.[6] G06F** *17/00*

**U.S. Cl. 364—565** **5 Claims**

**1**. An ultrasonic measuring apparatus for a vehicle comprising:

a first ultrasonic transducer for transmitting ultrasonic waves to a road forwardly of the vehicle in a running direction of the vehicle and downwardly at a first predefined down-angle relative to the road, receiving reflected waves from the road and providing a first speed vector;

a second ultrasonic transducer and a third ultrasonic transducer, disposed respectively forwardly of and rearwardly of a rotational center of the vehicle and separated from each other at a predetermined distance, for respectively transmitting ultrasonic waves toward opposite sides of the vehicle respectively and at right angles to the running direction of the vehicle and respectively at second and third predefined down-angles relative to the road and receiving reflected waves from the road to provide second and third speed vectors; and




a calculating means for calculating a two-dimensional speed of the vehicle on the basis of the speed vectors obtained by the first, second and third ultrasonic transducers.

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**5,491,649**

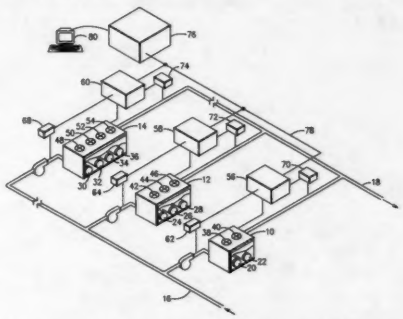
## CONFIGURATIVE CONTROL FOR HVAC SYSTEMS

**Arthur F. Friday, Jr.; Chi-Ping Chan, both of Liverpool, and Brett A. Desmarais, Cicero, all of N.Y., assignors to Carrier Corporation, Syracuse, N.Y.**

**Filed Oct. 29, 1993, Ser. No. 143,029**

**Int. Cl.[6] G05B** *13/00*

**U.S. Cl. 364—579** **19 Claims**




**1**. In a system having a plurality of individual heating or cooling units, each having a programmable control unit including a processor and memory associated therewith, the programmable control unit interfacing with a set of discrete elements that implement the prescribed heating or cooling of the individual heating or cooling unit, a process executable by the processors in at least two programmable control units comprising the steps of:

controlling the heating or cooling to be performed by the heating or cooling unit through a control program common to the control program in at least the one other control unit, the control program being stored in the memory associated with the processor in each programmable control unit, the control program stored in the memory associated with the processor in each programmable control unit having a set of control variables identical to the control variables of the control program stored in the memory of the processor in the other programmable control unit, the control variables in each control program having program control values that vary from time to time as the control program is repeatedly executed by the processor; and

accessing configuration data stored in the memory associated with the processor in each programmable control unit when communication of control values is to occur between the programmable control unit and the discrete elements that implement the prescribed heating or cooling, the configuration data comprising a set of first indicia corresponding to the

control variables wherein each particular first indicia corresponds to a particular control variable, and a set of second indicia corresponding to the discrete elements that are actually present in the particular heating or cooling unit wherein each particular second indicia corresponds to a particular discrete element, and wherein the configuration data further comprises stored associations of said second indicia linked to respective first indicia whereby each second indicia is linked to a respective first indicia, said step of accessing configuration data comparing the steps of:

using a first indicia to identify a linked second indicia corresponding to a particular discrete element when communication of a program control value is initiated by the programmable control unit; and

using a second indicia corresponding to a particular discrete element so as to identify a linked first indicia corresponding to a particular control variable when communication of a control value is initiated by the particular discrete element.

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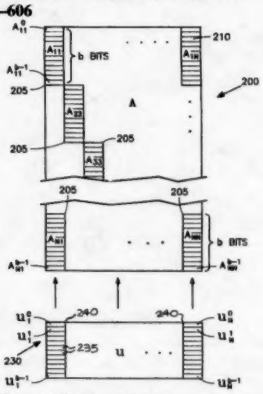
**5,491,650**

## HIGH PRECISION COMPUTING WITH CHARGE DOMAIN DEVICES AND A PSEUDO-SPECTRAL METHOD THEREFOR

**Jacob Barhen, LaCresenta; Nikzad Toomarian, Encino; Amir Fijany, Granada Hills, and Michail Zak, Cypress, all of Calif., assignors to California Institute of Technology, Pasadena, Calif.**

**Filed Apr. 19, 1993, Ser. No. 49,829**
**Int. Cl.[6] G06J *1/00*; G06F *7/52***
**U.S. Cl. 364—606** **15 Claims**




1. An MVM processing comprising:

an array of N rows and M columns of CCD matrix cell groups corresponding to a matrix of N rows and M columns of matrix elements, each of said matrix elements representable with b binary bits of precision, each of said matrix cell groups comprising a column of b CCD cells storing b CCD charge packets representing the b binary bits of the corresponding matrix element, the amount of charge in each packet corresponding to one of two predetermined amounts of charge wherein each of said CCD cells comprising a holding site and a charge sensing site, each charge packet initially residing at the respective holding site;

means for sensing, for each row, an analog signal corresponding to a total amount of charge residing under all charge sensing sites of the CCD cells in the row;

an array of c rows and M columns CCD vector cells corresponding to a vector of M elements representable with c binary bits of precision, each one of said M columns of CCD vector cells storing a plurality of c charge packets representing the c binary bits of the corresponding vector element, the amount of charge in each packet corresponding to one of two predetermined amounts of charge; and

multiplying means operative for each one of said c rows of said CCD vector cells for temporarily transferring to said charge sensing site the charge packet in each one of said M columns of matrix cells for which the charge packet in the corresponding one of said M columns and said one row of said CCD vector cells has an amount of charge corresponding to a predetermined binary value.

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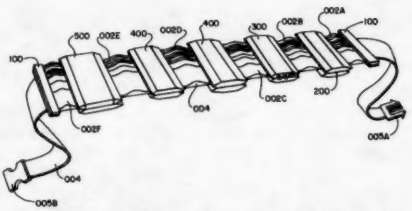
**5,491,651**

## FLEXIBLE WEARABLE COMPUTER

**Craig M. Janik, Palo Alto, Calif., assignor to Key, Idea Development, Northfield, Minn.**

**Continuation-in-part of Ser. No. 884,117, May 15, 1992, Pat. No. 5,285,398. This application Feb. 7, 1994, Ser. No. 192,636**
**Int. Cl.[6] G06F *1/00*; H05K *5/00***
**U.S. Cl. 364—708.1** **20 Claims**




1. A portable computer comprising, in combination, elements for computing comprising

input means for inputting data,

output means for outputting data, and

a plurality of computing components;

a flexible non-stretchable human wearable member;

means for rigidly mounting said computing elements on said wearable member; and

flexible signal relaying means electrically connecting said computing elements, the length of said relaying means between any two of said computing elements being greater than the length of said wearable member between said any two computing elements.

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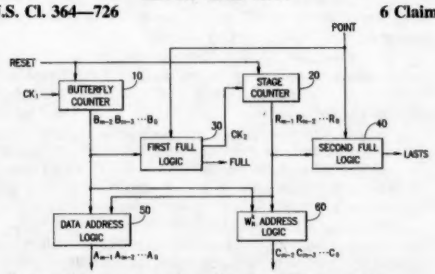
**5,491,652**

## FAST FOURIER TRANSFORM ADDRESS GENERATOR

**Wenzhe Luo, and Jiasheng Xu, both of Beijing, China, assignors to United Microelectronics Corporation, Taiwan, Prov. of China**

**Filed Oct. 21, 1994, Ser. No. 327,284**
**Int. Cl.[6] G06F *15/00***
**U.S. Cl. 364—726** **6 Claims**




1. An address generator for a $2^m$-point FFT comprising:

a butterfly counting mechanism for counting a butterfly count ($B_{m-2}B_{m-3} \ldots B_0$) for each butterfly stage of FFT in numerical sequence;

a stage counting mechanism for counting a stage count ($R_{m-1}R_{m-2} \ldots R_0$) for the butterfly stage of FFT in bit-shifting manner;

a data address logic mechanism, coupled to said butterfly counting mechanism and said stage counting mechanism, for receiving said butterfly count ($B_{m-2}B_{m-3} \ldots B_0$) and said stage count ($R_{m-1}R_{m-2} \ldots R_0$), and for generating a data address ($A_{m-1}A_{m-2} \ldots A_0$) according to a first predetermined logic function:

$$\begin{cases} A_{m-1} = R_{m-1}S + (R_{m-2} + R_{m-3} + \ldots + R_0)B_{m-2} \\ \cdot \\ \cdot \\ \cdot \\ A_{m-k} = (R_{m-1} + \ldots + R_{m-k+1})B_{m-k} + R_{m-k}S + \\ \qquad (R_{m-k-1} + \ldots + R_0)B_{m-k-1} \\ \cdot \\ \cdot \\ \cdot \\ A_0 = (R_{m-1} + R_{m-2} + \ldots + R_1)B_0 + R_0S \end{cases}$$

wherein S is a select signal for the upper/lower data addresses in a butterfly of FFT; and

a twiddle factor address logic mechanism, coupled to said butterfly counting mechanism and said stage counting mechanism for receiving said butterfly count ($B_{m-2}B_{m-3} \ldots B_0$) and said stage count ($R_{m-1}R_{m-2} \ldots R_0$), and for generating a twiddle factor address ($C_{m-2}C_{m-3} \ldots C_0$) according to a second predetermined logic function:

$$(C_{m-2}C_{m-3} \ldots C_0) = R_0(000 \ldots 0) + R_1(B_0 00 \ldots 0) + R_2(B_1B_0 0 \ldots 0) + \ldots + R_{m-1}(B_{m-2}B_{m-3}B_{m-4} \ldots B_0)$$

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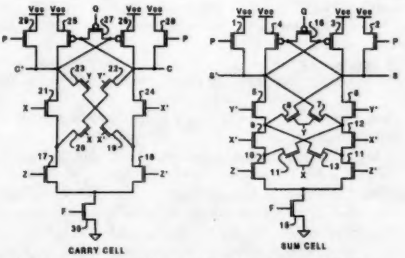
**5,491,653**

## DIFFERENTIAL CARRY-SAVE ADDER AND MULTIPLIER

**Michael P. Taborn, and Paul K. Miller, both of Austin, Tex., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed Oct. 6, 1994, Ser. No. 318,924**
**Int. Cl.[6] G06F** *7/50;7/52*
**U.S. Cl. 364—784** **19 Claims**




1. A 3-2 carry-save adder for a multiplier, comprising:

a carry cell including a first pair of cross-coupled transistors connected connected to a first voltage rail, wherein an output of a first transistor of the pair of cross-coupled transistors is coupled to and controls an input of a second transistor of the pair of cross-coupled transistors and an output of the second transistor of the pair of cross-coupled transistors is coupled to and controls an input of the first transistor of the pair of cross-coupled transistors, a first and second precharge transistor, each having a first terminal connected to the first voltage rail and a second terminal connected to an output terminal of the first pair of cross-coupled transistors, and being controlled by a clock, a first enable transistor connected to a second voltage rail, having an output, and having an input controlled by the complement of the clock, and a carry circuit receiving three input signals and three complement input signals and having a carry output and a carry complementary output, wherein the carry output is connected to the output terminal of the first transistor of the first pair of cross-coupled transistors, and the carry complementary output is connected to the output terminal of the second transistor of the first pair of cross-coupled transistors, and further wherein the carry circuit is enabled by the output of the first enable transistor; and

a sum cell including a second pair of cross-coupled transistors connected connected to the first voltage rail, wherein an output of a first transistor of the pair of cross-coupled transistors is coupled to and controls an input of a second transistor of the pair of cross-coupled transistors and an output of the second transistor of the pair of cross-coupled transistors is coupled to and controls an input of the first transistor of the pair of cross-coupled transistors, a third and fourth precharge transistor, each having a first terminal connected to the first voltage rail and a second terminal connected to an output terminal of the first pair of cross-coupled transistors, and being controlled by a clock, a first enable transistor connected to a second voltage rail, having an output, and having an input controlled by the complement of the clock, and a carry circuit receiving the three input signals and the three complement input signals and having a sum output and a sum complementary output, wherein the sum output is connected to the output terminal of the first transistor of the second pair of cross-coupled transistors, and the sum complementary output is connected to the output terminal of the second transistor of the second pair of cross-coupled transistors, and further wherein the carry circuit is enabled by the output of the second enable transistor.

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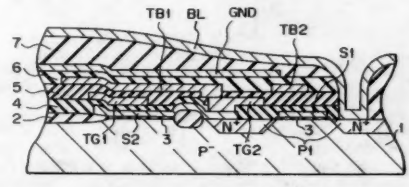
**5,491,654**

## STATIC RANDOM ACCESS MEMORY DEVICE HAVING THIN FILM TRANSISTOR LOADS

**Mituhiro Azuma, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan**

**Filed Aug. 8, 1994, Ser. No. 288,276**
**Claims priority, application Japan, Aug. 13, 1993, 5-222218**
**Int. Cl.[6] G11C** *11/34*
**U.S. Cl. 365—156** **15 Claims**




1. A static random access semiconductor memory device having a first inverter circuit formed by serially connecting a first load thin film transistor to a first driving MIS transistor and a second inverter circuit formed by serially connecting a second load thin film transistor to a second driving MIS transistor, an output of one of said first and second inverter circuits being connected to an input of the other of said first and second inverter circuits, comprising:

first and second conductive layers, each serving as gate electrodes of said first and second load thin film transistors respectively;

first and second semiconductor layers partly opposing said first and second conductive layers, respectively, said first semiconductor layer having a source region, a channel region and a drain region of said first load thin film transistor, said second semiconductor layer having a source region, a channel region and a drain region of said second load thin film transistor;

a first insulating layer interposed between said first conductive layer and said first semiconductor layer and between said second conductive layer and said second semiconductor layer;

a third conductive layer partly opposing at least the channel regions of said first and second semiconductor layers, for receiving a definite potential; and

a second insulating layer interposed between said first semiconductor layer and said third conductive layer and between said second semiconductor layer and said third conductive layer.

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**5,491,655**

## SEMICONDUCTOR MEMORY DEVICE HAVING NON-SELECTING LEVEL GENERATION CIRCUITRY FOR PROVIDING A LOW POTENTIAL DURING READING MODE AND HIGH LEVEL POTENTIAL DURING ANOTHER OPERATION MODE

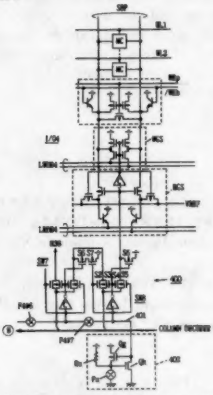
**Toshihiko Hirose; Shigeki Ohbayashi; Setsu Kondo; Takashi Hayasaka; Yoshiyuki Fujino, and Masayuki Iketani, all of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan**

**Division of Ser. No. 271,691, Jul. 7, 1994. This application Mar. 10, 1995, Ser. No. 402,218**

**Claims priority, application Japan, Jul. 8, 1993, 5-168983**

**Int. Cl.[6] G11C *7/00***

**U.S. Cl. 365—177** **4 Claims**



1. A semiconductor memory device, comprising:

a plurality of memory cells arranged in rows and columns;

a plurality of pairs of complementary first and second bit lines arranged corresponding to respective columns and each pair connecting memory cells on a corresponding column;

read data bus including a pair of complementary first and second data lines;

a plurality of pairs of first and second bipolar transistors provided for the respective pairs of first and second bit lines, each of said first bipolar transistors coupled to said first data line in an emitter follower fashion and each of said second bipolar transistors coupled to said second data line in the emitter follower fashion;

a plurality of first switching means provided corresponding to said plurality of pairs of first and second bit lines and responsive to a column selection signal for transferring potentials of the first and second bit lines of corresponding bit line pairs to respective bases of corresponding first and second bipolar transistors;

a reference line for transmitting a non-selection level voltage;

a plurality of second switching means provided corresponding to said plurality of pairs of first and second bit lines and responsive to said column selection signal for turning on complementarily to corresponding first switching means to transfer said non-selection level voltage to bases of corresponding first and second bipolar transistors; and,

generator means for generating onto said reference line as said non-selection level signal a voltage having a level lower than or equal to a low level potential of a selected bit line by said column selection signal in data reading operation mode and a level higher than or equal to a high level potential of the selected bit line in an operation mode other than said data reading operation mode.

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**5,491,656**

## NON-VOLATILE SEMICONDUCTOR MEMORY DEVICE AND A METHOD OF USING THE SAME

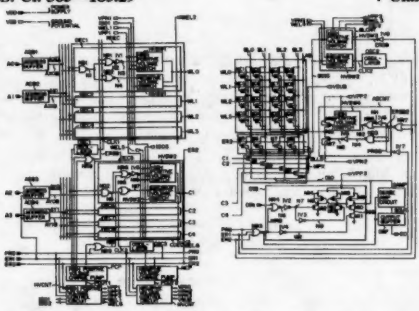
**Kikuzo Sawada, Sagamihara, Japan, assignor to Nippon Steel Corporation, Tokyo, Japan**

**Continuation-in-part of Ser. No. 50,660, Apr. 22, 1993, Pat. No. 5,408,429. This application Apr. 25, 1994, Ser. No. 231,684**

**Claims priority, application Japan, Apr. 24, 1992, 4-131491; Apr. 26, 1993, 5-122013**

**Int. Cl.[6] G11C *11/34***

**U.S. Cl. 365—185.29** **7 Claims**



1. An electrically alterable non-volatile semiconductor memory device comprising:

a plurality of memory cells formed on a semiconductor substrate and arranged in a matrix of columns and rows, each memory cell having a control gate, a floating gate, a drain and a source;

a plurality of row lines each connected to the control gates of said memory cells arranged in one row;

a plurality of column lines each connected to the drains of said memory cells arranged in one column;

one source line connected to the sources of said plurality of memory cells;

a row decoder for selecting one of said plurality of row lines;

a column decoder for selecting one of said plurality of column lines;

an input terminal for receiving data which is to be written in a selected memory cell;

mode selection means for selecting one of four modes, including a writing mode for setting a selected one of said plurality of memory cells in a written state in accordance with said received data, a first erasing mode for setting a memory cell group arranged in one row including said selected memory cell in an unwritten state, a second erasing mode for setting only the selected memory cell in the unwritten state, and a reading mode for detecting whether said selected memory cell is in said written state or said unwritten state; and

voltage applying means for applying one set of voltages, selected from first, second, third and fourth predetermined sets of voltages, in accordance with the mode selected by said mode selection means to a row line selected by said row decoder, non-selected row lines, a column line selected by said column decoder, non-selected column lines, said source line and said substrate, respectively;

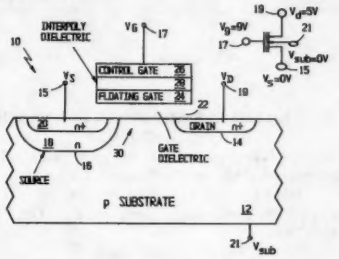
said voltage applying means including voltage selection means for applying a voltage having the same level to said selected column line and said non-selected column lines when said first erasing mode is selected and for applying a first voltage to said selected column line and applying a second voltage higher than said first voltage to said a source line when said second erasing mode is selected.

## 5,491,657

### METHOD FOR BULK (OR BYTE) CHARGING AND DISCHARGING AN ARRAY OF FLASH EEPROM MEMORY CELLS

**Sameer S. Haddad, San Jose, and Hao Fang, Cupertino, both of Calif., assignors to Advanced Micro Devices, Inc., Sunnyvale, Calif.**

**Filed Feb. 24, 1995, Ser. No. 393,636**
**Int. Cl.[6] G11C** *11/40*
**U.S. Cl. 365—185.27** **23 Claims**




**1**. A method for bulk (or byte) charging an array of flash EEPROM memory cells, said memory cells being formed on a substrate to define columns and rows, where the substrate includes a common source line extending along at least one of the rows, common substrate line, and a plurality of bit lines extending along respective columns, where each memory cell includes an n-type source region coupled to the common source line, a control gate, a floating gate, a channel region, and an n-type drain region coupled to a respective one of the bit lines, said method comprising the bulk (or byte) charging steps of:

applying a negative voltage to the substrate of the array;

applying simultaneously a reference voltage of zero volts to drain regions of selected memory cells in the array that are to be programmed; and

applying simultaneously the same reference voltage of zero volts to control gates of the selected memory cells, said source regions being allowed to float.

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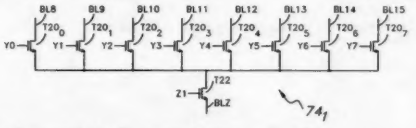
## 5,491,658

### COLUMN DECODER FOR VIRTUAL GROUND MEMORY ARRAY

**John F. Schreck, and Phat C. Truong, both of Houston, Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.**

**Filed Feb. 13, 1991, Ser. No. 655,566**
**Int. Cl.[6] Q11C** *16/06*
**U.S. Cl. 365—185.16** **12 Claims**




**1**. A memory device, comprising:

an array of rows and columns of memory cells;

a plurality of alternating first and second column lines, a column of cells coupled between each pair of adjacent column lines, the cells in each column being coupled to a first column line and a second column line;

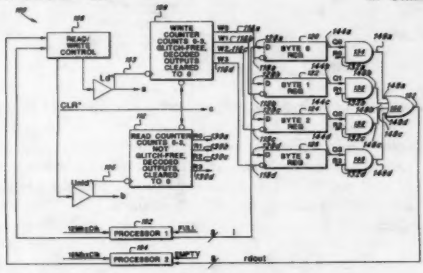
a first decoder for selecting a plurality of first column lines in response to first decoded address signals and selecting one of said selected plurality of first column lines in response to second decoded address signals.

## 5,491,659

### HAZARD-FREE CIRCUITRY FOR DETERMINING FULL AND EMPTY CONDITIONS IN FIRST-IN-FIRST-OUT MEMORY

**Dave Howarter, Del Mar, and George Wiley, San Diego, both of Calif., assignors to Hughes Aircraft Corp., Los Angeles, Calif.**

**Filed Jan. 13, 1995, Ser. No. 372,480**
**Int. Cl.[6] G11C** *7/00*
**U.S. Cl. 365—219** **19 Claims**




**1**. A first-in-first-out memory including:

a memory for storing data, the memory having a prescribed number of memory locations to which the data can be written and from which the data can be read;

a write counter coupled to the memory, the write counter including write pointer means for pointing to a write location within the memory to which subsequent data is to be written, the write counter being capable of assuming the prescribed number of states and further including write pointer incrementing means for incrementing the write pointer means in response to the data being written to the memory;

a read counter coupled to the memory, the read counter including read pointer means for pointing to a read location within the memory from which stored data is to be read, the read counter being capable of assuming the prescribed number of states and further including read pointer incrementing means for incrementing the read pointer means in response to the data being read from the memory;

an empty condition counter coupled to the memory, the empty condition counter including empty pointer means for maintaining an empty pointer count, the empty condition counter being capable of assuming at least one more than the prescribed number of states and further including means for incrementing the empty pointer means in response to the data being read from the memory;

a full condition counter coupled to the memory, the full condition counter including full pointer means for maintaining a full pointer count, the full condition counter being capable of assuming at least one more than the prescribed number of states and further including means for incrementing the full pointer means in response to the data being written to the memory; and

full flag generator means for generating a full flag signal in response to the full pointer count leading the empty pointer count by a first prescribed difference.

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## 5,491,660

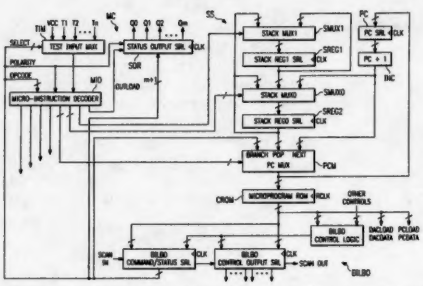
### ON-CHIP OPERATION CONTROL FOR MEMORIES

**Benjamin H. Ashmore, Jr., Houston, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.**

**Filed Nov. 18, 1994, Ser. No. 341,733**
**Int. Cl.[6] G11C** *7/00*
**U.S. Cl. 365—230.02** **14 Claims**

**1**. A method for controlling operation of a memory array formed on a single integrated-circuit chip in response to microcodes from an external source, said method comprising:

forming a control-read-only-memory on said chip;



programming instructions for performing said operation in said control-read-only-memory; and

forming a microsequencer on said chip to perform, in response to said microcodes from said external source, said operation of said memory array according to said instructions programmed in said control-read-only-memory;

wherein said microsequencer includes a test multiplexer for receiving microcodes from said external source and for coupling a first signal to an instruction decoder; said instruction decoder also receiving an operation code from said control-read-only-memory, said instruction decoder controlling a subroutine stack; a program counter multiplexer for receiving said operation code, for receiving a second signal from said subroutine stack, and for receiving a third signal from an incrementer, said program counter multiplexer furnishing a fourth signal to said control-read-only-memory; and said incrementer taking said fourth signal from said program counter multiplexer and, from said fourth signal, generating said third signal as a next microcode address.

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**5,491,661**

## SEMICONDUCTOR STATIC RANDOM ACCESS MEMORY DEVICE HAVING PREVIOUSLY EQUALIZABLE MEMORY CELLS

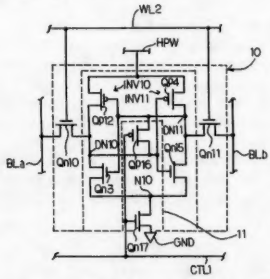
**Masato Motomura, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan**

**Filed Dec. 21, 1994, Ser. No. 360,619**

**Claims priority, application Japan, Dec. 27, 1993, 5-329348**

**Int. Cl.[6] G11C** *13/00*

**U.S. Cl. 365—230.01** **7 Claims**



1. A semiconductor static random access memory device selectively entering into a write-in phase and a read-out phase, comprising:

a first bit line and a second bit line paired with each other for propagating a potential difference indicative of a data bit;

a word line changed between an active level and an inactive level in both write-in and read-out phases; and

a memory cell coupled to first and second sources of voltage level different in voltage level from each other, and having first and second memory nodes for storing said potential difference indicative of said data bit,

a first switching means coupled between said first and second memory nodes and said first and second bit lines, respectively when said word line is changed to said active level,

a second switching means coupled between said first and second memory nodes and said first and second sources of voltage level, and operative to selectively connect said first and second memory nodes to said first and second sources of voltage level depending upon a logic level of said data bit, and

an equalizing means coupled between said first memory node and said second memory node and responsive to a balance control signal for equalizing a voltage level at said first memory node to a voltage level at said second memory node.

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**5,491,662**

## MICROCONTROLLER MEMORY CELL CURRENT READING METHOD

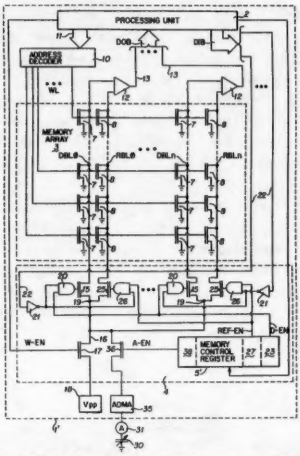
**Saverio Pezzini, Vimercate, Italy, assignor to SGS-Thomson Microelectronics S.r.l., Agrate Brianza, Italy**

**Filed Jun. 27, 1994, Ser. No. 266,939**

**Claims priority, application European Pat. Off., Jun. 28, 1993, 93830278**

**Int. Cl.[6] G11C** *16/06*

**U.S. Cl. 365—189.03** **29 Claims**



1. A method of reading the current of memory cells in a memory array on a microcontroller chip, the method comprising the steps of:

supplying a low voltage to a programming voltage supply line of the memory array on the microcontroller chip, the low voltage being insufficient to write to a memory cell;

performing a write operation to a selected cell of the memory array; and

measuring current flow through the selected cell.

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**5,491,663**

## PRE-CHARGED SLAVE LATCH WITH PARALLEL PREVIOUS STATE MEMORY

**Thomas A. Teel, Carrollton, Tex., assignor to SGS-Thomson Microelectronics, Inc., Carrollton, Tex.**

**Filed Nov. 30, 1994, Ser. No. 346,748**

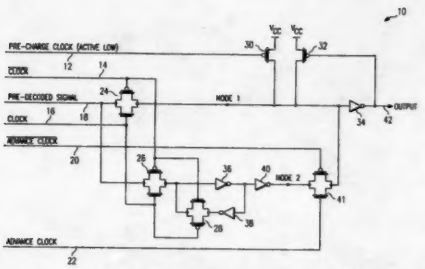
**Int. Cl.[6] G11C** *7/00*

**U.S. Cl. 365—189.05** **24 Claims**

12. A parallel memory element structure for retaining a previous state of data, comprising:

a first clock signal;

a second clock signal;




a pre-decoded input signal to a first pass gate of the parallel memory element structure, wherein the first pass gate is controlled by the first clock signal and the first pass gate passes through the pre-decoded input signal to an output node of the first pass gate when controlled to do so by the first clock signal;

a first inverter element connected to an output node of the first pass gate;

an output node, having an output signal, connected to an output terminal of the first inverter;

a second pass gate controlled by the second clock signal and connected to an input terminal of the first inverter; and

a third pass gate controlled by the first clock signal which stores a data state of the pre-decoded input signal in a storage element connected to the third pass gate when controlled to do so by the first clock signal.

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**5,491,664**

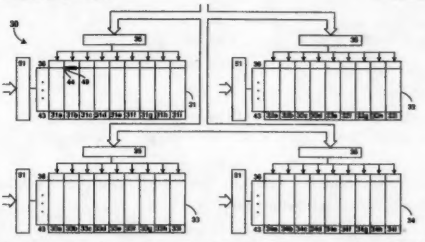
**FLEXIBILTIY FOR COLUMN REDUNDANCY IN A DIVIDED ARRAY ARCHITECTURE**

**Cathal G. Phelan, Santa Clara, Calif., assignor to Cypress Semiconductor Corporation, San Jose, Calif.**

**Filed Sep. 27, 1993, Ser. No. 127,241**

**Int. Cl.[6] G11C** *7/00;29/00*

**U.S. Cl. 365—200** **5 Claims**



1. A memory device operating in an architecture scheme having a plurality of memory sub-arrays, said memory device comprising:

a storage element, said storage element being uniquely addressed;

an activating element for activating at least one memory cell within said storage element;

a first selecting element for selecting said storage element and being coupled to said storage element;

a second selecting element for selecting said activating element and being coupled to said activating element;

a bus element for reading information from said at least one memory cell within said storage element, wherein said bus element is coupled to said storage element; and

an alternative storage element for alternatively storing information in the event that said storage element is defective permanently disabling said defective storage element and programming an unique address of said defective storage element for said alternative storage element, said alternative storage element being coupled to said activating and bus elements, wherein said defective storage element and said alternative storage element are located in either the same or separate of said plurality of memory sub-arrays, said alternative storage element including at least one redundancy memory block,

wherein said at least one redundancy memory block includes a programmable element, and wherein said programmable element includes a sense amplifier.

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**5,491,665**

**$I_{DDQ}$-TESTABLE RAM**

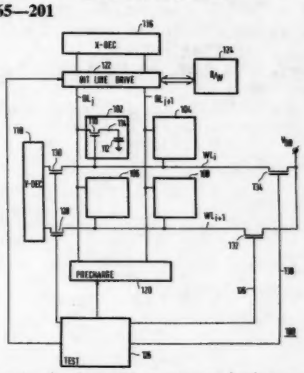
**Manoj Sachdev, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.**

**Filed Aug. 31, 1994, Ser. No. 299,043**

**Claims priority, application European Pat. Off., Sep. 1, 1993, 93202555**

**Int. Cl.[6] G11C** *13/00*

**U.S. Cl. 365—201** **12 Claims**




1. Electronic circuitry with a memory having a plurality of memory cells functionally organized in rows and columns, characterized in that the circuitry comprises test circuitry for selectively operative to connect and access simultaneously and in parallel a selected number of at least two memory cells of at least a particular one of the columns to simultaneously test said memory cells, at least nondefective ones of said memory cells not having hot-electron injection or Fowler-Nordheim tunneling induced during testing.

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**5,491,666**

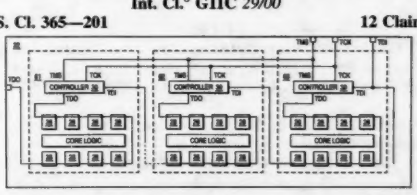
**APPARATUS FOR CONFIGURING A SUBSET OF AN INTEGRATED CIRCUIT HAVING BOUNDARY SCAN CIRCUITRY CONNECTED IN SERIES AND A METHOD THEREOF**

**Jay Sturges, Orangevale, Calif., assignor to Intel Corporation, Santa Clara, Calif.**

**Continuation of Ser. No. 302,496, Sep. 8, 1994, which is a division of Ser. No. 208,938, Mar. 10, 1994, Pat. No. 5,448,525. This application Jun. 23, 1995, Ser. No. 470,328**

**Int. Cl.[6] G11C** *29/00*

**U.S. Cl. 365—201** **12 Claims**




7. An integrated circuit comprising:

a plurality of core logic circuits comprising at least one input and at least one output for implementing at least one logic or storage function during normal circuit operation, said core logic circuits being configured on a single substrate of said

integrated circuit, and at least one output of a first core logic circuit being coupled to an input of a second core logic circuit;

a plurality of independent test devices located on said single substrate, each independent test device comprising a controller and a plurality of registers that corresponds to a core logic circuit to receive data in said registers for boundary scan testing of said corresponding core logic circuit during a test operation; and

wherein independent operation of said test devices permit configuring said registers in said second core logic circuit in response to said output of said first core logic circuit during normal circuit operation of said first core logic circuit and during test operation of said second core logic circuit.

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**5,491,667**

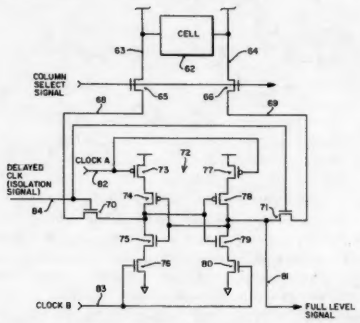
**SENSE AMPLIFIER WITH ISOLATION TO BIT LINES DURING SENSING**

**P. Owen Sharp, Aptos, Calif., assignor to Silicon Engineering, Inc., Scotts Valley, Calif.**

**Division of Ser. No. 738,921, Aug. 1, 1991, Pat. No. 5,257,236. This application Jan. 5, 1993, Ser. No. 498**

**Int. Cl.[6] G11C** *7/00*

**U.S. Cl. 365—205** **2 Claims**




1. A sense amplifier for sensing complementary data signals from static memory cells on first and second lines comprising:

a first and a second node, said first node being coupled to said first line through a first isolation device, said second node being coupled to said second line through a second isolation device;

said first and second nodes being cross coupled nodes in a latch;

timing means coupled to said first and second isolation devices for causing said devices to isolate said latch from said first and second lines once said complementary data signals have been coupled to said latch and said latch has been activated so as to reduce the load on said latch as said latch seeks one of its two stable states.

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**5,491,668**

**METHOD FOR DETERMINING THE THICKNESS OF A CASING IN A WELLBORE BY SIGNAL PROCESSING PULSE-ECHO DATA FROM AN ACOUSTIC PULSE-ECHO IMAGING TOOL**

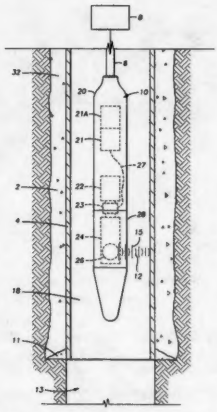
**John F. Priest, Tomball, Tex., assignor to Western Atlas International, Inc., Houston, Tex.**

**Filed May 13, 1994, Ser. No. 242,118**

**Int. Cl.[6] G01V** *1/40*

**U.S. Cl. 367—35** **4 Claims**

1. A method for determining the thickness of a casing installed in a wellbore penetrating an earth formation from a reflection signal generated by an acoustic pulse-echo imaging tool deployed within said casing, said method comprising the steps of:




a) calculating a first plurality of Fourier coefficient pairs from a first plurality of numbers representing digitized amplitudes of said reflection signal;

b) calculating a second plurality of Fourier coefficient pairs from a second plurality of numbers representing modified digitized amplitudes of said reflection signal, said modified digitized amplitudes being calculated by multiplying each said digitized amplitude in said first plurality of numbers by an index number representing the ordinal position of each said digitized amplitude in said first plurality of numbers;

c) calculating a group delay function from said first plurality of Fourier coefficient pairs and said second plurality of Fourier coefficient pairs and determining a maximum value within said group delay function;

d) determining a frequency at which said group delay function reaches said maximum value; and

e) calculating the thickness of said casing from said frequency.

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**5,491,669**

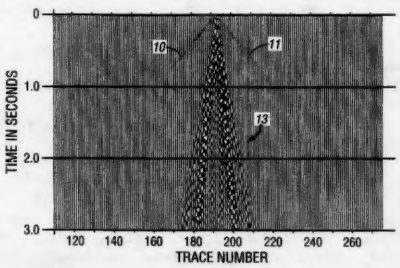
**METHOD FOR IDENTIFYING AND SUPPRESSING ANOMALOUS FREQUENCY COMPONENTS IN SEISMIC DATA**

**Ronald E. Chambers, Houston, Tex., assignor to Western Atlas International, Houston, Tex.**

**Filed Oct. 6, 1994, Ser. No. 319,276**

**Int. Cl.[6] G01V** *1/36*

**U.S. Cl. 267—49** **6 Claims**




1. A method for abating spectral noise contamination from a block of seismic data signals acquired and recorded as a set of time-scaled seismic data traces, comprising:

partitioning said block of seismic data into selected time windows;

resolving the spectrum of said seismic data block by octaves for each said time window;

calculating a desired raw statistic from the difference between the measured spectrum and a preselected model spectrum for each time window and each octave;

decomposing said statistic within each said time window for each octave into organizational components to calculate a noise statistic;

recombining said organizational components into a noise-free statistic after removing of said noise statistic therefrom;

for each trace comprising said block of data signals, comparing the raw statistic for each time window and each octave with said recombined statistic;

scaling the amplitude of the seismic data signals on each said trace by a coefficient equal to the ratio between the recombined statistic and the raw statistic when said raw statistic exceeds said recombined statistic; and

displaying said scaled seismic data signals formatted as a block of substantially contamination-free time-scale traces representative of a cross section of a portion of the earth.

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**5,491,670**

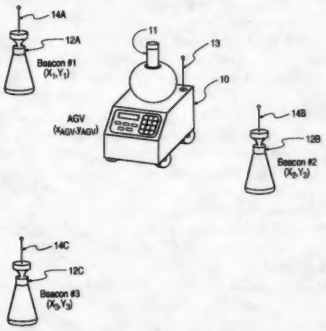
**SYSTEM AND METHOD FOR SONIC POSITIONING**

**T. Jerome Weber, 952 Trophy Dr., Mountain View, Calif. 94040**

**Continuation of Ser. No. 7,641, Jan. 21, 1993, abandoned. This application Jul. 21, 1994, Ser. No. 278,678**

**Int. Cl.[6] G01S** *3/80*

**U.S. Cl. 367—127** **43 Claims**




**1**. A system for determining the position of an object within a gas-filled space, said system comprising:

one or more beacons placed at positions throughout said space, each of said beacons including sound generating means for emitting sound into said space;

wherein said object comprises:

means for determining the positions of said one or more beacons;

means for determining the distance between each of said one or more beacons and said object, said means for determining the distance comprising:

means for measuring the time required for a sound generated by one of said beacons to reach said object; and

means for converting said measured time to a distance; and

means for determining from said distances the position of said object within said space.

**5,491,671**

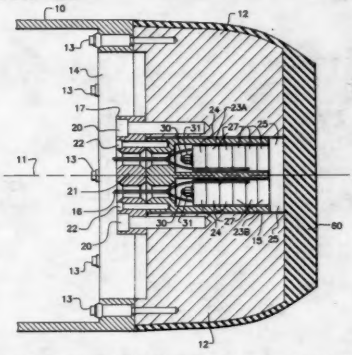
**SONAR TRANSDUCER WITH UNITARY ISOLATOR**

**Allan F. Potter, Kirkland, Wash., assignor to Alliant Techsystems Inc., Hopkins, Minn.**

**Continuation-in-part of Ser. No. 604,241, Apr. 26, 1984, abandoned. This application Nov. 27, 1987, Ser. No. 129,411**

**Int. Cl.[6] H04R** *17/00*

**U.S. Cl. 367—158** **3 Claims**




**1**. In a transducer assembly for a torpedo wherein said assembly comprises a plurality of individual transducers, each of said transducers having dual functions of (i) producing a mechanical output as a function of an applied electrical signal, and (ii) producing an electrical signal as a function of an applied mechanical signal, and each of said transducers comprising a head mass, a tail mass, and at least one piezoelectric element interposed between said head mass and said tail mass, said transducers when used to produce an electrical signal, as aforesaid, having a normal range of operating frequencies of applied mechanical signals, and each of said transducers being attached to said torpedo by an improved mounting means and vibration isolator comprising:

an elongated unitary metallic member having a longitudinal axis, a central aperture extending axially between first and second axially spaced apart ends, said aperture being adapted to receive an assembled transducer tail mass and at least one piezoelectric element with a head mass integral therewith being connected in abutting relationship with said first of said spaced apart ends of said member, said mounting means further comprising a first plurality of pairs of apposed slots extending transversely into said member in opposite directions along a first transverse axis normal to said longitudinal axis to terminate short of said longitudinal axis, a second plurality of pairs of apposed slots extending transversely into said member in opposite directions along a second transverse axis normal to said longitudinal axis to terminate short of said longitudinal axis, each slot having first and second normally spaced apart faces such that for increasing static force applied to the head mass said first and second faces move from an at rest position relative to and toward one another, said transverse axes being at a preselected angular relationship, said pairs of slots being spaced axially and alternately along said members, the other of said spaced apart ends being adapted to be connected to said torpedo, said member being fabricated from a preselected metallic material and said distance between said faces of said slots being selected so that said member has spring characteristics and absorbs acoustic energy having frequencies within said normal range of operating frequencies, and said slots being preselected so that upon said static force exceeding a preselected level, said first and second faces move into mutual engagement so as to protect said piezoelectric element located in said central aperture thereof against damage, said faces being gradually returned to said at rest position for decreasing static force applied to said read mass.

## 5,491,672
## WATCHMAN'S CLOCK SYSTEM

**Royston Ferris, Norwich, United Kingdom, assignor to Roster Control Systems, Ltd., Norfolk, United Kingdom**

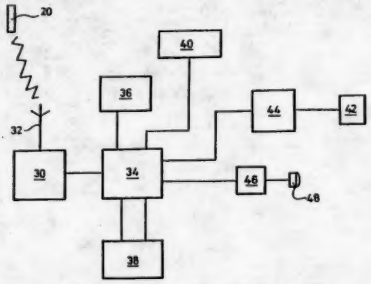
**PCT No. PCT/GB94/00841, § 371 Date Dec. 14, 1994, § 102(e) Date Dec. 14, 1994, PCT Pub. No. WO94/25937, PCT Pub. Date Nov. 10, 1994**

**PCT Filed Apr. 21, 1994, Ser. No. 356,240**

**Claims priority, application United Kingdom, Apr. 23, 1993, 9308426**

**Int. Cl.[6] G04B** *47/00;* **G06K** *7/10*

**U.S. Cl. 368—10** **13 Claims**




1. Watchman's clock system comprising a portable time clock capable of interrogating and reading one or more of a plurality of identification means, each of which may represent, and be located at, a specific location, without any physical contact being made between the time clock and such identification means, of recording the identity of each such identification means, and thereby its specific location, and of storing such recorded information therein for subsequent transfer to a computer, in which the time clock comprises means for generating dial tone multi-frequency (DTMF) tones and in which information stored in the time clock is transferred from the time clock to the computer via a modem by means of such tones.

## 5,491,673
## TIMING SIGNAL GENERATION CIRCUIT

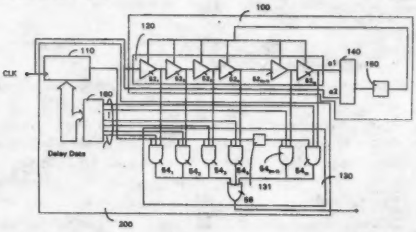
**Toshiyuki Okayasu, Kurihashi, Japan, assignor to Advantest Corporation, Tokyo, Japan**

**Filed Nov. 30, 1994, Ser. No. 346,876**

**Claims priority, application Japan, Jun. 2, 1994, 6-143950**

**Int. Cl.[6] G04F** *8/00;* **H03K** *5/159*

**U.S. Cl. 368—120** **7 Claims**




1. A timing signal generation circuit, comprising:

a plurality of variable delay devices serially connected one another, each variable delay device having a propagation time delay which is substantially smaller than one period of a clock signal;

a phase comparator which compares a total delay time of said variable delay devices derived from the last stage of said variable delay devices with said clock signal and generates a voltage signal indicative of the difference between the two;

a feed back circuit that feeds back said voltage signal from said phase comparator to said variable delay devices to form a phase locked loop so that said total delay time of said variable delay devices is equal to the one period of said clock signal;

a synchronous delay circuit provided with said clock signal for generating a large delay time which is proportional to said clock signal period;

a selector circuit which is provided with said large delay time from said synchronous delay circuit and small delay times from said variable delay devices for selecting one combination of said large delay time from said synchronous delay circuit and a small delay time from one of said variable delay devices.

## 5,491,674
## DISK-REPRODUCED SIGNAL EQUALIZER FOR USE IN CONSTANT WAVE LENGTH-CONSTANT ANGULAR VELOCITY SCHEME

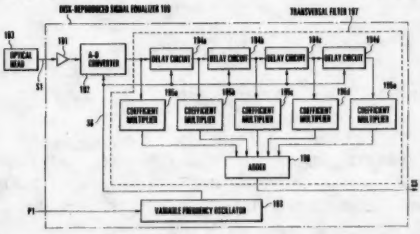
**Shinichi Kitahara, Tokyo, Japan, assignor to NEC Corporation, Japan**

**Filed Oct. 11, 1994, Ser. No. 320,872**

**Claims priority, application Japan, Jan. 12, 1993, 5-253863**

**Int. Cl.[6] G11B** *17/22*

**U.S. Cl. 369—32** **5 Claims**




1. A disk-reproduced signal equalizer for processing a disk-reproduced signal comprising:

a plurality of pairs of delay means arranged in correspondence with a plurality of divided track areas on a disk and respectively having delay characteristics for each track area, with respect to a reproduced signal input from a disk recording/reproducing apparatus of a constant wave length-constant angular velocity scheme of performing a recording/reproducing operation at a substantially constant recording wave length by changing a clock frequency in accordance with a track position while keeping a rotational speed of the disk constant, each of said delay means having a plurality of output taps;

selection means for selecting one pair of said plurality of pairs of delay means on the basis of information supplied from said disk recording/reproducing apparatus and indicating a track position; and

differential amplifier means for receiving outputs from a plurality of output taps of said one pair of delay means selected from said plurality of pairs of delay means, and performing predetermined equalization processing, whereby the disk-reproduced signal is processed to obtain a desired, optimized equalization characteristic.

## 5,491,675
## SINGLE RETURN PATH ORTHOGONALLY-ARRANGED OPTICAL FOCUS AND TRACKING SENSOR SYSTEM

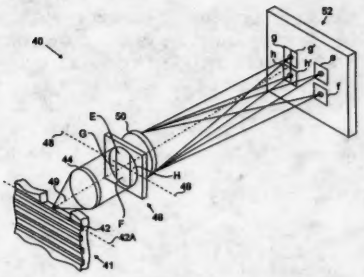
**David B. Kay, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.**

**Filed Jun. 14, 1994, Ser. No. 259,655**

**Int. Cl.[6] G11B** *7/085*

**U.S. Cl. 369—44.23** **18 Claims**

18. A multi-element prism for separating a return beam, resulting from application of a radiation beam to a data track of an optical storage medium, into a number of portions, said prism comprising:



a first separator element to separate a first portion of said return beam, said first separator element arranged on one side of a plane substantially parallel to a reference plane defined by an optical axis of said radiation beam and a tangent to said data track;

a second separator element to separate a second portion of said return beam, said second separator element arranged on an opposite side of said plane substantially parallel to said reference plane, said first and said second separator elements separating the return beam along said plane substantially parallel to the reference plane;

a third separator element to separate a third portion of said return beam; and

a fourth separator element to separate a fourth portion of said return beam, said third and said fourth separator elements arranged adjacent to and on opposite sides of said first and said second separator elements, and separating the return beam along planes substantially perpendicular to said reference plane;

wherein at least one of said first, second, third and fourth separator elements has a linearly-sloped beam-directing surface.

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**5,491,676**

**TRACKING CONTROL APPARATUS AND TRACK JUMP DETECTION APPARATUS**

**Hiroyuki Yamaguchi, Hirakata; Mitsuro Moriya, Ikoma, and Shinichi Yamada, Katano, all of, Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan**

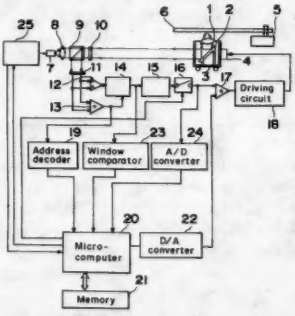
**Continuation of Ser. No. 986,544, Dec. 7, 1992, abandoned.**

**This application Jun. 15, 1994, Ser. No. 261,088**

**Claims priority, application Japan, Dec. 9, 1991, 3-324428**

**Int. Cl.[6] G11B 7/00**

**U.S. Cl. 369—44.28** **8 Claims**




5. A tracking control apparatus comprising:

a conversion means for recording information on and for reproducing information from a recording medium having a plurality of tracks on which information is recorded and is to be recorded;

a location detection means for detecting a locational relationship on said recording medium between said conversion means and said plurality of tracks;

a transfer means for transferring said conversion means in a direction perpendicular to said plurality tracks on said recording medium;

a tracking control means for controlling said conversion means by driving said transfer means n accordance with an output from said location detection means, so that said conversion means always follows a target track;

a track jump detection means for detecting as a track jump said conversion means failing to follow said target track;

an analog to digital conversion means for sampling and digitizing a signal for driving said transfer means,

a read/write memory for storing a plurality of signals sampled and digitized by said analog to digital conversion means for a predetermined time interval which has occurred prior to the detection of a track jump,

a reversing means for reversing polarities of said plurality of signals read out from said read/write memory; and

a prohibition means for prohibiting the recording of information; and

a control means for making said tracking control means inoperative and for driving said transfer means in accordance with signals obtained by reversing polarities of said plurality of signals and digital to analog converting said plurality of signals and for making said prohibition means operative to prohibit the recording when said track jump detection means has detected a track jump and, thereafter, making said tracking control means operative and releasing the prohibition by said prohibition means.

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**5,491,677**

**RECORDING AND/OR REPRODUCING APPARATUS AND METHOD OF CONTROLLING SAME**

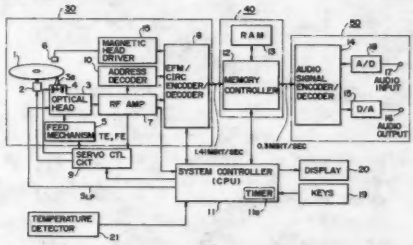
**Yoshio Sasaki, Kanagawa, Japan, assignor to Sony Corporation, Tokyo, Japan**

**Filed Apr. 6, 1994, Ser. No. 223,554**

**Claims priority, application Japan, Apr. 12, 1993, 5-107266**

**Int. Cl.[6] G11B 7/00**

**U.S. Cl. 369—44.36** **14 Claims**




1. A recording and/or reproducing apparatus for recording data on and/or reproducing data from a recording medium, said apparatus comprising:

recording and/or reproducing means movable relatively to the recording medium, for recording data on the recording medium and/or reproducing recorded data from the recording medium;

a memory for temporarily storing data outputted from said recording and/or reproducing means or input data to be recorded on the recording medium;

memory control means for controlling said memory to write and read data such that the data outputted from said recording and/or reproducing means are written in said memory or the input data to be recorded on the recording medium which are temporarily stored in said memory are read from said memory at a transfer rate higher than the transfer rate at which the data outputted from said recording and/or reproducing means which are temporarily stored in said memory are read from

said memory or the input data to be recorded on the recording medium are written in said memory;

servo control means for generating a servo control signal based on an error signal generated based on the data outputted from said recording and/or reproducing means, and supplying the generated servo control signal to said recording and/or reproducing means, said servo control means having an adjustable servo control gain; and

system control means for controlling operation of said recording and/or reproducing means, said memory control means, and said servo control means, said system control means comprising means for controlling said recording and/or reproducing means to intermittently record data on the recording medium or reproduce recorded data from the recording medium based on the amount of data stored in said memory, and means for controlling said servo control means to automatically adjust the servo control gain thereof while the operation of said recording and/or reproducing means to record or reproduce data is being interrupted.

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**5,491,678**

## METHOD AND APPARATUS FOR RECORDING/REPRODUCING INFORMATION DATA IN A TWO-DIMENSIONAL FORMAT

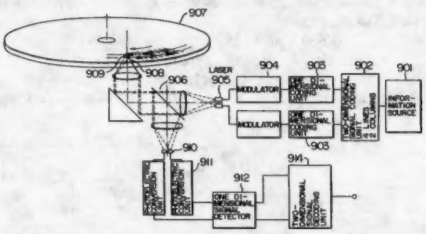
**Takeshi Maeda, Kokubunji; Atsushi Saito, Ichikawa, and Hiroshi Ide, Kodaira, all of, Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Continuation of Ser. No. 704,227, May 22, 1991, abandoned. This application Aug. 2, 1994, Ser. No. 285,003**

**Claims priority, application Japan, May 25, 1990, 2-133823**

**Int. Cl.[6] G11B** *7/00*

**U.S. Cl. 369—59** **26 Claims**




1. An information apparatus comprising:

buffer means for storing therein recording data in a unit for conversion to a two-dimensional format;

converting means for converting said recording data into n rows×m columns of two-dimensional data arrangements corresponding to said unit of data, where n and m are integers of at least two;

m light sources;

recording means for subdividing said n×m two-dimensional data arrangements into m columns of one-dimensional data columns so as to be read out, and for recording said m columns of one-dimensional data columns on a single track by said m light sources; and

optical means for converging luminous fluxes from said m light sources and for forming m light spots on a disk plane;

wherein said recording data are recorded on said disk plane as an optically distinguishable information identifier group having n×m two-dimensional extended areas; and

wherein a distance between adjacent light spots of said m columns on said single track in a track radial direction of said disk plane is smaller than a diameter of a respective one of said adjacent light spots.

**5,491,679**

## INFORMATION RECORDING AND/OR REPRODUCING APPARATUS WITH SHUTTER MEMBER AND SHUTTLE LINKED FOR MOVEMENT TOGETHER

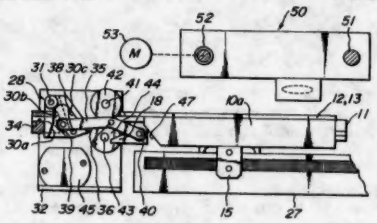
**Tsuyoshi Togawa, Hino, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan**

**Filed Aug. 17, 1993, Ser. No. 106,947**

**Claims priority, application Japan, Aug. 19, 1992, 4-220231**

**Int. Cl.[6] G11B** *33/02;17/04*

**U.S. Cl. 369—77.2** **5 Claims**




1. An apparatus for recording and/or reproducing information on and/or from a record medium comprising:

a record medium insertion opening through which a record medium is inserted into and removed from the apparatus;

a recording and/or reproducing head for recording and/or reproducing information on and/or from the record medium;

a supporting means for supporting the record medium and arranged movably in a first direction between a loading position and a recording and/or reproducing position, said loading position being a position at which said record medium is inserted into said record medium insertion opening or is discharged from said record medium insertion opening;

a driving means for moving said supporting means in the first direction with respect to the head between said loading position and said recording and/or reproducing position;

a shutter member arranged movably between a first position in which the record medium insertion opening is closed by the shutter member and a second position at which said record medium insertion opening is not closed by said shutter member; and

a link member having a first portion which is engaged with said supporting means when the supporting means is in said loading position and a second portion which is engaged with said shutter member when said first portion is engaged with the supporting means to move the shutter member into said second position to open the record medium insertion opening;

wherein the link member comprises a lever arranged move between a first position and a second position, a first roller arranged at one end of the lever such that the first roller is brought into contact with said supporting means in said loading position and the lever is moved into the second position, and a second roller arranged at the other end of the lever, and said shutter member comprises a flap portion which closes said record medium inserting opening, and a cam portion having first and second engaging portions which are engaged with said second roller such that when said supporting means is in said recording and/or reproducing position and said lever is in said first position, the first engaging portion of the cam portion is engaged with the second roller to close the record medium insertion opening by the flap portion and when said supporting means is in said loading position and said lever is moved into said second position by an engagement of the supporting means with the first roller, said second portion of the cam portion is engaged with the second roller to open the record medium insertion opening.

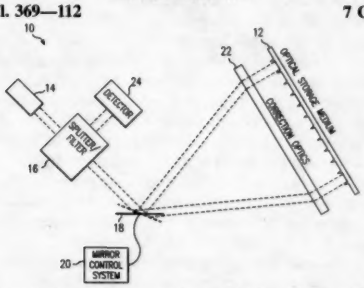
## 5,491,680
## OPTICAL TRACKING SYSTEM FOR POSITIONING A BEAM OF LIGHT

**Giles A. Pauli, Austin, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.**

**Continuation of Ser. No. 104,260, Aug. 9, 1993, abandoned, which is a continuation of Ser. No. 968,214, Oct. 29, 1992, abandoned, which is a continuation of Ser. No. 533,980, Jun. 6, 1990, abandoned. This application Oct. 7, 1994, Ser. No. 320,014**

**Int. Cl.[6] G11B *7/00***

**U.S. Cl. 369—112** **7 Claims**




**2**. An optical tracking system for positioning a beam of light on an optical storage medium, comprising:

a light source operable to generate the beam;

a mirror rotatable about an axis fixed a predetermined distance from said light source and operable to selectively deflect the beam toward a plurality of selected positions on the surface of the optical storage medium, the optical storage medium operable to reflect the beam to generate a reflected beam, wherein the mirror comprises:

a torsion rod fixed with respect to a semiconductor substrate, thereby forming the axis;

a torsion beam pivotally connected to the torsion rod; and

an electrode connected to the semiconductor substrate to provide an electrostatic force to the torsion beam;

an electrical mirror control system coupled to said mirror and operable to control the rotation of said mirror, wherein the mirror is directly responsive to the electrostatic force that is resultant from electrical control signals from the electrical mirror control system such that the beam may be directed toward an plurality of selectable positions on the surface of the optical storage medium to access said plurality of positions;

a detector disposed in the path of the reflected beam operable to read data stored by the optical medium responsive to the reflected beam, the reflected beam and the impinging beam having substantially coincident paths; and

a beam splitter disposed in the coincident paths and operable to direct the reflected beam to said detector.

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## 5,491,681
## PEAK DETECTOR FOR AMPLITUDE MODULATED SIGNALS

**Hans W. Klein, and Sriram Narayan, both of Pleasanton, Calif., assignors to I M P, Inc., San Jose, Calif.**

**Filed Dec. 13, 1993, Ser. No. 166,247**

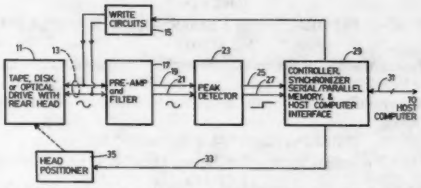
**Int. Cl.[6] G11B *7/00***

**U.S. Cl. 369—124** **11 Claims**

**1**. A method of determination successive ocurrences of peaks in an input signal having a time varying amplitude, comprising the steps of:

shifting the input signal in phase, thereby to develop a phase shifted version of the input signal in a form of a replica thereof,

monitoring a difference in the time varying amplitudes of both the input signal and the phase shifted version thereof,




detecting successive instances wherein the amplitudes of the input signal and the phase shifted version thereof are substantially equal, thereby to determine successive occurrences of peaks in said input signal,

storing the amplitude of the input signal substantially coincident with individual instances of detecting when the input signal and the phase shifted version thereof are substantially equal, said storing step including storing a voltage proportional to that of the input signal amplitude in a first storage element, and

charging another storage element with a voltage proportional to the voltage stored in the first storage element at a time after an individual instance of detecting that said amplitude difference is equal to substantially zero but before a next occurrence of such a detection.

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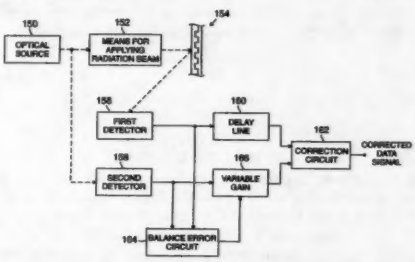
## 5,491,682
## APPARATUS AND METHOD FOR CONTROLLABLE GAIN AND PHASE MATCHING IN AN OPTICAL DATA STORAGE SYSTEM WITH SOURCE NOISE SUBTRACTION

**Steven C. Dohmeier, Rochester, and Edward C. Gage, Fairport, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.**

**Filed Sep. 21, 1994, Ser. No. 309,837**

**Int. Cl.[6] G11B *7/00***

**U.S. Cl. 369—124** **20 Claims**




**1**. An apparatus for use in an optical system in which data is stored on an optical storage medium, the apparatus comprising:

an optical source to generate a radiation beam;

means for applying the radiation beam to the storage medium;

a first detector providing a data signal by detecting a return beam resulting from application of the radiation beam to the medium;

a second detector providing a source monitor signal by detecting radiation from the optical source;

a correction circuit adapted to receive the data signal and the source monitor signal from the first and second detectors, respectively, and generate a corrected data signal therefrom;

a variable gain circuit connected between at least one of the detectors and the correction circuit; and

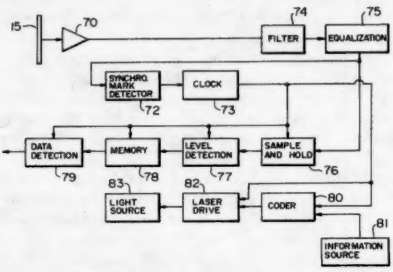
a balance error circuit responsive to the data signal and the source monitor signal and having an output connected to a gain control input of the variable gain circuit for controlling the variable gain thereof.

5,491,683

## OPTICAL INFORMATION RECORDING/REPRODUCING METHOD

Takeshi Maeda, Kokubunji; Hisataka Sugiyama; Hirofumi Sukeda, both of Kodaira, and Kouichirou Wakabayashi, Kokubunji, all of, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Dec. 21, 1994, Ser. No. 360,327
Claims priority, application Japan, Dec. 24, 1993, 5-326818
Int. Cl.[6] G11B 7/00
U.S. Cl. 369—124 15 Claims




1. An optical information recording/reproducing method in which information is recorded on a rotary disk in an optically discriminative form, a light emitted from a light source is focused on the surface of said disk to form a light spot, said information is scanned with said light spot relative thereto in a rotating direction of said disk, and a reflection light or transmitting light from said disk is collected by an optical system to record or reproduce the information, said method comprising the steps of:

(a) recording information indicative of the product of first information having a spatial frequency component higher than that resolvable by said optical system and second information having a spatial frequency component higher than that resolvable by said optical system on the surface of said disk; and

(b) converting a frequency component prepared from said information indicative of the product and being higher than said spatial frequency resolvable by said optical system into a spatial frequency component detectable by said optical system.

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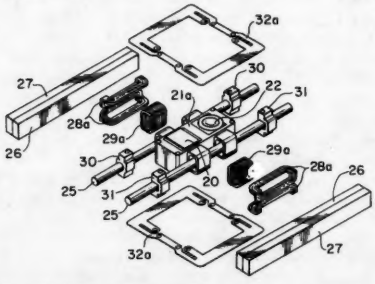
5,491,684

## OPTICAL DISK UNIT

Yuji Terashima; Takashi Haruguchi; Hirohiko Ohwaki, and Yoshinobu Soeda, all of Fukuoka, Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Apr. 1, 1994, Ser. No. 221,929
Claims priority, application Japan, Apr. 2, 1993, 5-076623; Jul. 20, 1993, 5-179189
Int. Cl.[6] G11B 21/02;21/12
U.S. Cl. 369—219 3 Claims




1. An optical disc unit, comprising:

a bobbin having means for emitting and detecting light and means for converging light, said means for emitting and detecting light and said means for converging light being integrally located within said bobbin;

first and second shafts each mounted on a respective opposite side of said bobbin, said first and second shafts guiding said bobbin in a direction radial to a recording medium;

a first pair of sliders mounted on said first shaft, one of said first pair of sliders being positioned forwardly of said bobbin, and the other of said first pair of sliders being positioned rearwardly of said bobbin, each of said first pairs of sliders being rotatable about and slidable on said first shaft;

a second pair of sliders mounted on said second shaft, one of said second pair of sliders being positioned forwardly of said bobbin, and the other of said second pair of sliders being positioned rearwardly of said bobbin, each of said second pairs of sliders being rotatable about and slidable on said second shaft, said second pair of sliders further being movable in a direction perpendicular to said second shaft;

a plurality of suspension springs fixedly secured to said first and second pairs of sliders, said suspension springs holding said bobbin so that said bobbin is movable in a direction perpendicular to a surface of the recording medium;

first and second actuator magnets each respectively mounted parallel and adjacent to said first and second shafts;

focusing drive means comprising first and second focusing coils each mounted on a respective opposite sides of said bobbin adjacent to a respective actuator magnet, said focusing coils being energizable for moving said bobbin in the direction perpendicular to the surface of the recording medium so that said first pair of sliders are rotated about said first shaft and said second pair of sliders are rotated about said second shaft and moved in the direction perpendicular to said second shaft; and

tracking drive means comprising first and second tracking-and-feed coils each mounted on a the respective opposite sides of said bobbin adjacent to the respective actuator magnet, said tracking-and-feed coils being energizable for moving said bobbin and said sliders along said first and second shafts.

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5,491,685

## SYSTEM AND METHOD OF DIGITAL COMPRESSION AND DECOMPRESSION USING SCALED QUANTIZATION OF VARIABLE-SIZED PACKETS

Mark D. Klein, Cupertino, and Dana Keen, Palo Alto, both of Calif., assignors to Digital Pictures, Inc., San Mateo, Calif.

Filed May 19, 1994, Ser. No. 246,110
Int. Cl.[6] H04B 14/06
U.S. Cl. 370—7 24 Claims

21. A system for decompressing a compressed digital signal, comprising:

a parser for extracting at least one start value, scaled samples, and scale values from the compressed digital signal, the start value representing a first sample of the signal and the scale values representing multipliers for obtaining decompressed samples from the scaled samples;

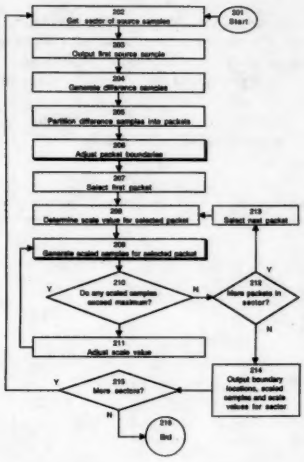
a result register for initially storing the start value and subsequently storing decompressed samples;

a multiplier, coupled to the parser, for multiplying the scaled samples by the scale values to generate values representing differences between adjacent decompressed samples;

an adding device, coupled to the multiplier, for adding the generated values to the contents of the result register to obtain decompressed samples; and

an output device coupled to the adding device, for outputting the decompressed samples;

wherein the result register is coupled to the parser and to the adding device.

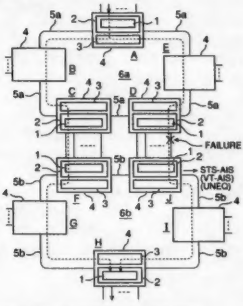


5,491,686

## COMPOSITE RING NETWORK HAVING AN INCREASED REDUNDANCY FOR RESTORING COMMUNICATION PATH

Kenji Sato, Kawasaki, Japan, assignor to Fujitsu Limited, Kanagawa, Japan

Filed Nov. 18, 1994, Ser. No. 342,137
Claims priority, application Japan, Mar. 18, 1994, 6-049057
Int. Cl.[6] H04L *12/437*
U.S. Cl. 370—16.100 9 Claims



1. A composite ring network comprising:

a plurality of ring networks each including a plurality of nodes;

each of said nodes having first and second paths extending therefrom for carrying an information signal, said first and second paths being connected to other nodes of said composite ring network, each of said nodes comprising:

a cross connect switch connected to said first and second paths for establishing a cross connection therebetween; and

a channel part connected to said cross connect switch and capable for sending a signal on both of said first and second paths simultaneously via said cross connect switch, said channel part selectively receiving an information signal from one of said first and second paths via said cross switch, said channel part including a path switch for selecting one of said first and second paths;

two of said ring networks being connected with each other at a pair of nodes, one of said two nodes being included in a first ring network and the other being included in a second ring network, by a bridging path;

each of said plurality of nodes including an alarm generation unit for generating a failure signal, when a failure has occurred in said bridging path, with a such format that said failure signal can be detected by said nodes forming said plurality of ring networks;

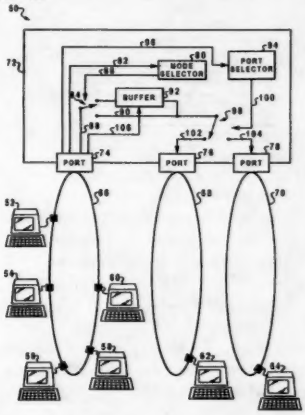
said path switch of said nodes selecting, in response to said failure signal supplied thereto via one of said first and second paths, a path other than said path that has carried said failure signal.

5,491,687

## METHOD AND SYSTEM IN A LOCAL AREA NETWORK SWITCH FOR DYNAMICALLY CHANGING OPERATING MODES

Kenneth J. Christensen, Apex; Michael S. Siegel, Raleigh; Norman C. Strole, Raleigh, and Raymond L. Zeisz, Jr., Raleigh, all of N.C., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Sep. 28, 1994, Ser. No. 314,111
Int. Cl.[6] H04L *29/14;12/46*
U.S. Cl. 370—17 10 Claims



1. A method for changing operating modes of a local area network switch, wherein said local area network switch includes a plurality of ports connected to a plurality of local area network segments, and wherein said local area network switch selectively transfers frames from a source port to a destination port, said method comprising the steps of:

operating said local area network switch in a first mode of operation wherein said frames are examined for errors as said frames are transferred from said source port to said destination port within said local area network switch;

calculating an error rate as a function of a percentage of said frames having errors; and

switching said local area network switch to a second mode of operation if said error rate exceeds a high error rate threshold, wherein said second mode of operation includes the steps of examining each frame for errors within said local area network switch, and transferring said frame from said source port

to said destination port only after completely examining said frame and determining that a number of errors within said frame is equal to or below a preselected number.

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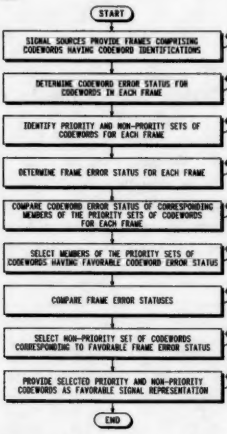
**5,491,688**

## METHOD FOR PROVIDING A FAVORABLE SIGNAL REPRESENTATION

**Paul Bocci, 23W732 W. Pine Ave., Roselle, Ill. 60172, and Lawrence E. Feldman, 1549 Bunescu, Buffalo Grove, Ill. 60089**

**Filed Jul. 5, 1994, Ser. No. 270,974**
**Int. Cl.**[6] **H04J** *13/00;* **G06F** *11/00*
**U.S. Cl. 370—18** **17 Claims**


START
SIGNAL SOURCES PROVIDE FRAMES COMPRISING CODEWORDS HAVING CODEWORD IDENTIFICATIONS
401
DETERMINE CODEWORD ERROR STATUS FOR CODEWORDS IN EACH FRAME
402
IDENTIFY PRIORITY AND NON-PRIORITY SETS OF CODEWORDS FOR EACH FRAME
403
DETERMINE FRAME ERROR STATUS FOR EACH FRAME
404
COMPARE CODEWORD ERROR STATUS OF CORRESPONDING MEMBERS OF THE PRIORITY SETS OF CODEWORDS FOR EACH FRAME
405
SELECT MEMBERS OF THE PRIORITY SETS OF CODEWORDS HAVING FAVORABLE CODEWORD ERROR STATUS
406
COMPARE FRAME ERROR STATUSES
407
SELECT NON-PRIORITY SET OF CODEWORDS CORRESPONDING TO FAVORABLE FRAME ERROR STATUS
408
PROVIDE SELECTED PRIORITY AND NON-PRIORITY CODEWORDS AS FAVORABLE SIGNAL REPRESENTATION
409
END

**1**. A method for providing a favorable signal representation, the method comprising the steps of:

a) providing frames from a plurality of signal sources, wherein each of the frames comprises a plurality of codewords, each codeword of the plurality of codewords having a codeword identification;

b) determining, for each frame, codeword error statuses that uniquely correspond to each codeword of the plurality of codewords;

c) identifying, for each frame, a priority set of codewords and a non-priority set of codewords of the plurality of codewords, wherein the codeword error statuses are provided for the priority set of codewords and the codeword error statuses are not provided for the non-priority set of codewords;

d) determining, for each frame, a frame error status based on the codeword error statuses;

e) comparing the codeword error statuses for members of the priority set of codewords for each frame, wherein the members have substantially identical codeword identifications;

f) selecting, responsive to the step of comparing the codeword error statuses, members having favorable codeword error statuses to produce selected priority codewords;

g) comparing the frame error statuses for each frame;

h) selecting, responsive to the step of comparing the frame error statuses, the non-priority set of codewords corresponding to a favorable frame error status to produce selected non-priority codewords; and

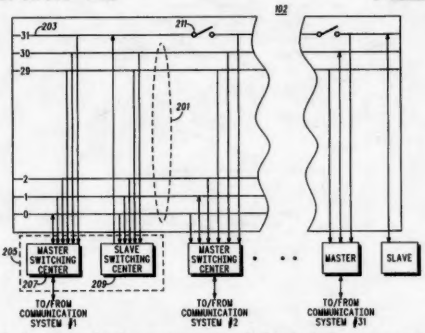
i) providing the selected priority codewords and the selected non-priority codewords as the favorable signal representation.

**5,491,689**

## METHOD AND APPARATUS FOR AUGMENTING LISTENING CAPACITY OF A SIGNAL DESTINATION

**John W. Maher, 2845 Boerderij Way, Woodstock, Ill. 60098, and James H. Errico, 604 Belinder La., Schaumburg, Ill. 60173**

**Filed Mar. 7, 1994, Ser. No. 206,709**
**Int. Cl.**[6] **H04M** *3/56;* **H04Q** *11/04*
**U.S. Cl. 370—58.1** **9 Claims**




**1**. A communication system network that includes a processing multiplexer coupled to a plurality of communication systems, wherein each of the communication systems comprises:

a plurality of signal sources, wherein at least some of the signal sources produce communication system data signals; and

a plurality of signal destinations; wherein the processing multiplexer comprises a plurality of shared communication ports that each support one of the plurality of communication systems, the processing multiplexer further comprising:

a dedicated communication port;

a slave switching center, coupled to the dedicated communication port and the shared communication ports, for summing communication system data signals from at least one of the shared communication ports to produce summed communication data, wherein the summed communication data is presented to the dedicated communication port; and

a master switching center, coupled to the dedicated communication port and the shared communication ports, for presenting processed communication data signals to at least one of the plurality of signal destinations of a select one of the plurality of communication systems, wherein the processed communication data signals comprise the summed communication data received from the dedicated communication port and the communication system data signals received from the shared communication ports.

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**5,491,690**

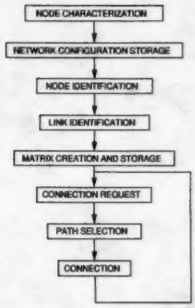
## METHOD AND APPARATUS TO SPEED UP THE PATH SELECTION IN A PACKET SWITCHING NETWORK

**Jean-Pierre Alfonsi, La Gaude; Claude Galand, Cagnes Sur Mer; Gerald Lebizay, Vence, and Olivier Maurel, Le Cannet, all of, France, assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed Jul. 22, 1994, Ser. No. 279,373**
**Claims priority, application European Pat. Off., Jul. 30, 1993, 93480104**
**Int. Cl.**[6] **H04L** *12/56*
**U.S. Cl. 370—60** **4 Claims**

**3**. A method for selecting a routing path in a packet communication network (**200**) comprising a plurality of nodes (**201** . . . **208**) interconnected with transmission links (**209**), said method being performed in a network access node and including the steps of:

storing and updating data in a network topology database, said data representing characteristics and attributes of the nodes and transmission links and defining the network configuration,




selecting links usable for forming data paths between the network access node and a destination node in the network, said selecting step including the further steps of using data stored in the network topology database to identify each link in the network as either a backbone link or a local link, selecting as usable for a path determination all backbone links, selecting as usable all local links attached to the network access node and to the destination node, discarding as not usable for a path determination all other links, and storing in the topology database link identifiers identifying all selected links,

determining, for a connection request to the destination node, an optimal routing path from said access node to the destination node using only the identified selected links.

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**5,491,691**

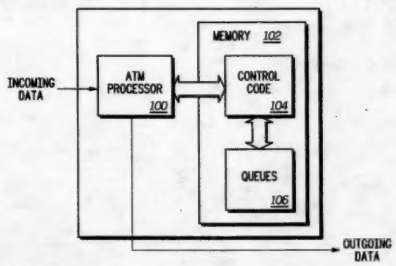
## METHOD AND APPARATUS FOR PACING ASYNCHRONOUS TRANSFER MODE (ATM) DATA CELL TRANSMISSION

**Ronen Shtayer, Tel-Aviv; Naveh Alon, Ranat Hashnron, and Joffe Alexander, Rehovot, all of, Israel, assignors to Motorola, Inc., Schaumburg, Ill.**

**Filed Aug. 16, 1994, Ser. No. 291,225**

**Int. Cl.**[6] **H04L** *12/433;* **H04Q** *11/04*

**U.S. Cl. 370—61** **30 Claims**




**16**. A method for transmitting asynchronous transfer mode (ATM) data cells in an asynchronous transfer mode (ATM) system, the method comprising:

(a) providing a plurality of queues wherein a first sub-portion of the plurality of queues are waiting queues and a second sub-portion of the plurality of queues are transmit queues, each queue in the plurality of queues being of a rank order wherein lower rank queues comprise the transmit queues and higher rank queues comprises the waiting queues;

(b) activating a plurality of active channels in the ATM system;

(c) creating a token for each active channel in the plurality of active channels;

(d) initially placing each token for each active channel into one of the waiting queues;

(e) shifting all tokens in the queues from a current queue in which the tokens reside to a queue having a lower rank;

(f) determining if any token reside in transmit queues;

(g) repeating steps (e) through (f) if no tokens reside in transmit queues in the step (f);

(h) selecting at least one token from the transmit queues if a token resides in the transmit queues from step (f);

(i) transmitting at least one ATM data cell on at least one channel which corresponds to the at least one token;

(j) rescheduling the at least one token into a queue in the plurality of queues; and

(k) performing steps (e) through (j) in a looping manner.

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**5,491,692**

## HYBRID UNITS FOR A COMMUNICATION NETWORK

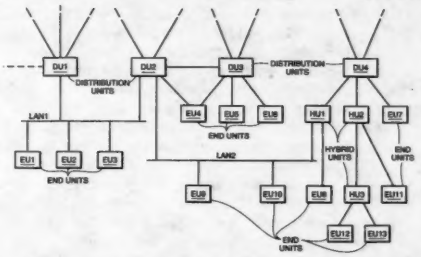
**Christopher W. Gunner, Harvard, Mass.; John A. Harper, Golfe Juan, France, and Ian M. C. Shand, Surrey, United Kingdom, assignors to Digital Equipment International Limited, Fribourg, Switzerland**

**Continuation of Ser. No. 896,268, Jun. 10, 1992, abandoned. This application Dec. 23, 1993, Ser. No. 173,719**

**Claims priority, application United Kingdom, Jun. 14, 1991, 9112898**

**Int. Cl.**[6] **H04L** *12/46*

**U.S. Cl. 370—85.13** **23 Claims**




**1**. A communication network comprising:

end units (EUs) and distribution units (DUs) coupled together by communication links, each end unit having one or more network service access points (NSAP) and each distribution unit including routing tables for routing data packets through the network between end units, the end units and distribution units maintaining knowledge of their neighboring end units and distribution units by exchanging EU-Hello and DU-Hello messages which indicate whether the sender is either an end unit or a distribution unit, and the EU-Hello and DU-Hello messages containing the NSAP(s) of the end units and distribution units, the DUs collectively maintaining complete information about all NSAPs; and

a hybrid unit (HU) having one HUE link and a plurality of HUD links, said HUE link coupled with one of said distribution units, each one of said HUD links coupled with one of said end units, said hybrid unit sending on the HUE link EU-Hello messages containing the NSAPs of all EUs from which it receives EU-Hello messages on its HUD links, and sending on the HUD links DU-Hello messages.

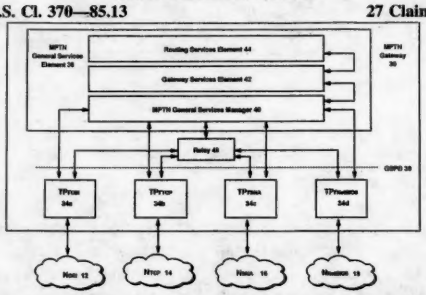
## 5,491,693
## GENERAL TRANSPORT LAYER GATEWAY FOR HETEROGENEOUS NETWORKS

**Kathryn H. Britton, Chapel Hill, N.C.; Tein-Yaw Chung, Chung-Li, Taiwan, Prov. of China; Willibald Doeringer, Langnau; Harold D. Dykeman, Dietikon, both of, Switzerland; Allan K. Edwards, Raleigh, N.C.; Johny Mathew, Cary, N.C.; Diane P. Pozefsky, Chapel Hill, N.C.; Soumitra Sarkar, Cary, N.C., and Roger D. Turner, Raleigh, N.C., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Continuation-in-part of Ser. No. 175,985, Dec. 30, 1993. This application Feb. 1, 1994, Ser. No. 189,816**

**Int. Cl.[6] H04L** *12/66;29/06*

**U.S. Cl. 370—85.13** **27 Claims**




1. A gateway for being interconnected between a first single protocol transport network SPTN running a first transport provider protocol and a second SPTN running a second transport provider protocol, for receiving from a node connected to said first SPTN a basic link unit BLU having header information conforming to said first protocol, for processing said first protocol BLU to a BLU having header information conforming to said second protocol, and conveying said second protocol BLU to a node connected to said second SPTN, said gateway comprising:

a first SPTN transport provider having means for receiving said first protocol BLU and means for processing said first protocol header information into a general form;

a second SPTN transport provider having means for conveying said second protocol BLU to said second SPTN, and means for processing general form header information into header information conforming to said second protocol; and

an element for providing general gateway services for said first and second SPTN transport providers comprising means for receiving general form header information from said first SPTN transport provider, means for processing said received general form header information, means for creating new general form header information and means for building a multiprotocol transport network MPTN header and means for conveying to said second SPTN transport provider said new general form header information and said MPTN header.

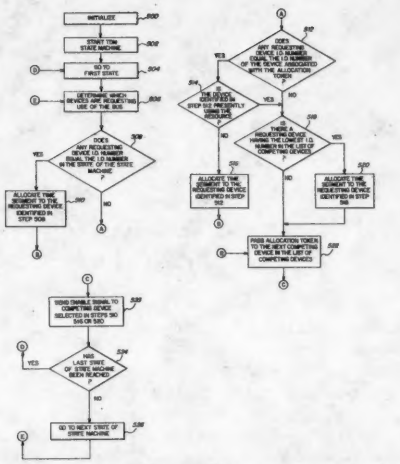
## 5,491,694
## SYSTEM AND METHOD FOR ALLOCATING A SHARED RESOURCE AMONG COMPETING DEVICES

**Chris Oliver, Rochester, and Dan Hullette, Wilton, both of N.H., assignors to Cabletron Systems, Inc., Del.**

**Division of Ser. No. 188,238, Jan. 28, 1994. This application Oct. 5, 1994, Ser. No. 318,277**

**Int. Cl.[6] H04J** *3/02;3/16*

**U.S. Cl. 370—85.4** **13 Claims**


INITIALIZE
START TDM STATE MACHINE
GO TO FIRST STATE
DETERMINE WHICH DEVICES ARE REQUESTING USE OF THE BUS
DOES ANY REQUESTING DEVICE I.D. NUMBER EQUAL THE I.D. NUMBER IN THE STATE OF THE STATE MACHINE ?
ALLOCATE TIME SEGMENT TO THE REQUESTING DEVICE IDENTIFIED IN STEP 508
DOES ANY REQUESTING DEVICE I.D. NUMBER EQUAL THE I.D. NUMBER IN THE LIST OF COMPETING DEVICES ?
IS THE DEVICE IDENTIFIED IN STEP 508 PRESENTLY IN THE LIST ?
IS A REQUESTING DEVICE'S I.D. NUMBER IN THE LIST OF COMPETING DEVICES ?
ALLOCATE TIME SEGMENT TO THE REQUESTING DEVICE IDENTIFIED IN STEP 512
ALLOCATE TIME SEGMENT TO THE REQUESTING DEVICE IDENTIFIED IN STEP 516
PASS ALLOCATION TOKEN TO THE NEXT COMPETING DEVICE IN THE LIST OF COMPETING DEVICES
SEND DOUBLE SIGNAL TO COMPETING DEVICE SELECTED IN STEP 510 OR 520
HAS LAST STATE OF STATE MACHINE BEEN REACHED ?
GO TO NEXT STATE OF STATE MACHINE

1. A method of allocating a bandwidth-limited, shared resource among a plurality of competing devices, comprising the steps of:

dividing an available time of the resource into a plurality of time segments;

allocating one or more of the time segments among the competing devices in a predetermined order to provide a first level of arbitration;

providing a list of competing devices;

allocating a token entitling one of the competing devices in the list of competing devices to a time segment;

allocating a time segment to the competing device having the token if the time segment is unallocated after the first level of arbitration to provide a second level of arbitration; and

allocating the time segment to the device having a predetermined rank in the list of competing devices if the time segment is unallocated after the second level of arbitration to provide a third level of arbitration.

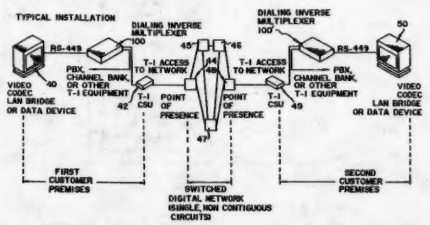
## 5,491,695
## MEANS AND METHOD OF DIAL UP BRIDGING OF NETWORK FOR HIGH BANDWIDTH DIGITAL COMMUNICATION

**John L. Meagher, Reston; Charles E. Rothrauff, Sterling, and Trey Alexander, Reston, all of Va., assignors to Digital Access Corporation, Reston, Va.**

**Continuation-in-part of Ser. No. 774,935, Oct. 11, 1991, abandoned, and a continuation-in-part of Ser. No. 906,324, Jun. 30, 1992, abandoned, which is a continuation-in-part of Ser. No. 731,042, Jul. 17, 1991, abandoned. This application Oct. 13, 1992, Ser. No. 959,902**

**Int. Cl.[6] H04J** *3/04*

**U.S. Cl. 370—112** **28 Claims**




1. A high bandwidth data loop, comprising:

a plurality of individual dial-up circuits of a telephone network;

a plurality of communication means respectively disposed at a plurality of locations for selectively accessing ones of said plurality of circuits so as to provide selectable single or multi-channel bandwidth or bit rate between any number of locations, for an indeterminate and controllable period of time; wherein said individual dial-up circuits are respectively terminated by ones of said plurality of communication means; and

a plurality of data switching means respectively disposed at said plurality of locations for changing data flow between a receiv-

ing mode which is not a SPEAKER mode and a transmitting mode which is a SPEAKER mode at a corresponding one of said plurality of communication means, and each of said plurality of data switching means having a switch for controlling operation between said transmitting mode and said receiving mode, wherein each of said plurality of communication means are selectively controllable by operation of a selected one of said plurality of data switching means at a selected one of said plurality of locations to cause transmission from a corresponding selected one of said plurality of communication means at said selected location to all other ones of said plurality of communication means at all other locations such that said selected location is in a SPEAKER mode and said selected location is a SPEAKER node, and all other ones of said plurality of communication means at all other locations are not in said SPEAKER mode; and wherein actuation of each said switch changes operation of the respective one of said plurality of data switching means to switch operation between said SPEAKER mode and said receiving mode.

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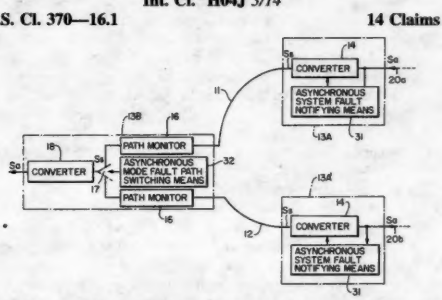
**5,491,696**

## SYNCHRONOUS/ASYNCHRONOUS SYSTEM HAVING FUNCTION OF SWITCHING PATH UPON FAULT

**Koichi Nishimura, Kawasaki, Japan, assignor to Fujitsu Limited, Kanagawa, Japan**

**Filed Jul. 29, 1994, Ser. No. 282,797**
**Claims priority, application Japan, Nov. 8, 1993, 5-278414**
**Int. Cl.[6] H04J** *3/14*
**U.S. Cl. 370—16.1** **14 Claims**




1. A composite asynchronous/synchronous system having the function of switching paths at the time of a fault, comprising:

a synchronous communication system (**10**), which has a path termination office (**13B**) inserted into ring-like transmission lines (**11** and **12**), and includes path monitors respectively receiving signal from said transmission lines and a path switch (**17**) for changing a synchronous mode path signal input from one of the ring-like transmission lines to a synchronous mode path signal input from the other line when a path monitor in the path termination office (**13B**) detects a synchronous path Alarm Indication Signal (first AIS) from said transmission line of said synchronous system showing one of (a) a synchronous mode path signal has been suspended on said one transmission line and (b) there is a fault in the path signal on said one transmission line;

an asynchronous communication system (**19**), which transmits an asynchronous mode signal and is combined with the synchronous communication system,

said composite asynchronous/synchronous system having at least

asynchronous system fault notifying means (**31**), which are provided in each of two connection offices (**13A** and **13A'**) connecting the synchronous communication system to the asynchronous communication system by two routes and which, when an asynchronous system fault defection signal (second AIS) occurs in said asynchronous system showing that there is a fault in an asynchronous mode signal, convert the fault detection signal to information recognizable in the synchronous mode and sends the information to the path termination office, and

an asynchronous system fault path switching means (**32**), provided in the path termination office, for receiving the fault detection signal, and detecting one of said fault detection signal from the asynchronous mode path signal and the fault detection signal sent from said asynchronous system fault notifying means, and switching the synchronous path signals transferred away from a fault on the ring-like transmission lines.

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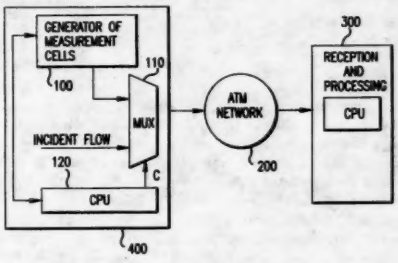
**5,491,697**

## METHOD AND DEVICE FOR MEASUREMENT OF PERFORMANCE PARAMETERS OF AN ASYNCHRONOUS TRANSFER MODE TRANSMISSION NETWORK

**Jean-Yves Tremel; René Garandel, both of Pleumeur Bodou, and Yves Jan, Rospez, all of, France, assignors to France Telecom, Paris, France**

**Filed Feb. 3, 1994, Ser. No. 191,399**
**Claims priority, application France, Feb. 16, 1993, 93 01736**
**Int. Cl.[6] G06F** *11/00*
**U.S. Cl. 371—5.1** **20 Claims**




1. A method for measurement of performance parameters of an asynchronous transfer mode transmission network having an asynchronous transfer mode channel, said method comprising:

generating identifiable measurement cells and inserting the identifiable measurement cells into an asynchronous incident flow transmitted by the asynchronous transfer mode channel,

receiving an asynchronous flow of cells from the asynchronous transfer mode channel,

counting a total number of cells received in the asynchronous flow of cells,

detecting the identifiable measurement cells among the asynchronous flow of cells and counting a total number of identifiable measurement cells received in the asynchronous flow of cells,

comparing a content of each individual identifiable measurement cell with an expected content for that individual identifiable measurement cell so as to detect transmission errors,

generating and memorizing a counting information element upon each reception of a given number of cells in the asynchronous flow of cells, the counting information element comprising the total number of cells received in the asynchronous flow of cells, and

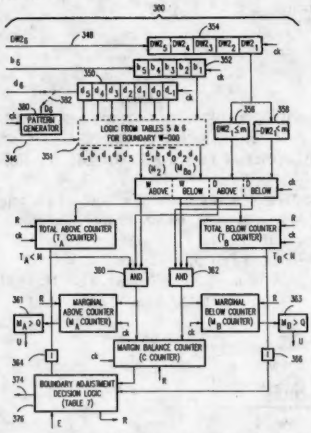
generating and memorizing an information element upon the reception whenever the content of each individual identifiable measurement cell does not correspond to the expected content for that individual identifiable measurement cell, the information element comprising the total number of cells received in the asynchronous flow of cells, the total number of identifiable measurement cells received in the asynchronous flow of cells, the content of that individual identifiable measurement cell and a number of errors declared.

## 5,491,698

## SETTING OPTIMAL BOUNDARY THRESHOLDS IN A DECODER FOR CODED SIGNAL PROCESSING CHANNELS

**Arvind M. Patel; Robert A. Rutledge, and Bum S. So, all of San Jose, Calif., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed Dec. 16, 1993, Ser. No. 169,817**
**Int. Cl.[6] H03M** *13/00*
**U.S. Cl. 371—6** **32 Claims**




**16**. Apparatus for improving data detection reliability in a coded signal processing channel in which digital electrical signals representing digital sample values are generated from analog signals read by a transducer from binary data recorded on a data storage medium, comprising:

means (**308**) for storing a plurality of threshold constants whose values define decision boundaries for use in determining whether detected binary data corresponding to a coded sequence of a runlength limited (RLL) code is a "1" or a "0";

means (including **351**) for processing binary data on-line for measuring error margins at each of a plurality of respective decision boundaries by using an abstract relationship between each preselected decision boundary and specific sequences of the detected binary data that are defined by corresponding Boolean logical expressions;

circuitry (**351**) for determining potential error events in the detected binary data by generating, for a selected state, first and second outputs ($W_{above}$, $W_{below}$) corresponding to one preselected data pattern and another preselected related data pattern, respectively, above and below a preselected one of said decision boundaries;

first and second counters ($T_A$, $T_B$) for respectively counting up to preselected numbers $N_1$ and $N_2$ total occurrences of said one and another preselected data patterns above and below said preselected one boundary, respectively;

means ($W_{above}$, $W_{below}$, **356**, $D_{above}$, **358**, $D_{below}$) establishing error margin distances $m_1$ units above and $m_2$ units below, respectively, said preselected one boundary;

third and fourth counters ($M_A$, $M_B$) for counting numbers of times actual values of a linear function of digital sample values corresponding to said one and another preselected data patterns are respectively within $m_1$ units and $m_2$ units, respectively, of said preselected boundary;

a margin balance counter (C) for accumulating a count having a magnitude and sign denoting difference between counts in said third and fourth counters; and

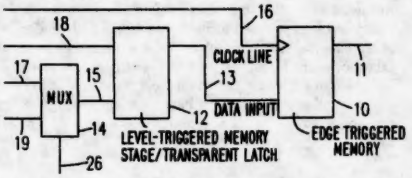
circuit means, conditioned by said first and second counters counting to selected numbers $N_1$ and $N_2$, respectively, for adjusting the preselected one boundary one unit up or one unit down provided the count in the margin balance counter has reached a preselected number $+S_1$ or a preselected number $-S_2$, respectively, where $S_1<N_1$ and $S_2<N_2$.

## 5,491,699

## REGISTER STAGE HAVING AT LEAST TWO MEMORY STAGES FOR COORDINATING DISPARATE CLOCK SIGNALS FOR USE IN BOUNDARY SCAN

**Kurt Scheuermann, and Harald Ebert, both of Nürnberg, Germany, assignors to U.S. Philips Corporation, New York, N.Y.**

**Filed Jun. 2, 1994, Ser. No. 253,040**
**Claims priority, application Germany, Jun. 3, 1993, 43 18 422.7**
**Int. Cl.[6] G01R** *31/3185*
**U.S. Cl. 371—22.1** **6 Claims**




**1**. An integrated circuit comprising a plurality of clocked register stages, each register stage comprising

a respective series arrangement of first and second memory stages, the first memory stage being one of an edge-triggered memory stage and a level-triggered memory stage, and the second of the memory stages being the other of the edge and level triggered memory stages each of the first and second memory stages having at least one respective clock input, a respective data input, and a respective data output,

a respective first multiplexer preceding the data input of the first memory stage, the respective first multiplexer having a respective select input, at least first and second respective data inputs, and a respective data output, wherein

during testing of the integrated circuit

the edge-triggered memory stages of the register stages receive a same first clock signal on their respective clock inputs, and

the level-clocked memory stages of the register stages receive a same second clock signal, the first and second clock signals having non-overlapping pulses, and

for loading and reading-out test signal patterns, each first multiplexer receives a first select signal on the respective select input in order to connect one of the respective data inputs for test signals to the respective data output, and

in normal operation, a first signal value is constantly applied to the respective clock input of each level-triggered memory stage of the register stages to switch said level-triggered memory stage to transparent operation.

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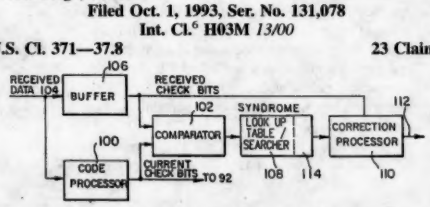
## 5,491,700

## METHOD AND APPARATUS FOR CODE ERROR CORRECTION USING AN ORDERED SYNDROME AND ERROR CORRECTION LOOKUP TABLE

**David Wright, Utica, N.Y., and Neal K. Riedel, Encinitas, Calif., assignors to Pacific Communication Sciences, Inc., San Diego, Calif.**

**Filed Oct. 1, 1993, Ser. No. 131,078**
**Int. Cl.[6] H03M** *13/00*
**U.S. Cl. 371—37.8** **23 Claims**




**12**. Apparatus for determining the error pattern necessary to correct bit errors present in a segment of digital data, wherein said segment has a segment length, said data being encoded using a block code, said apparatus comprising:

a table of predetermined syndromes, each of said predetermined syndromes having an associated error correction pattern, wherein said table is formed by selecting from all possible syndromes that could be predetermined from said segment length those predetermined syndromes having error patterns for correcting a predetermined number of errors within said segment and arranging said predetermined syndromes in said table in accordance with a predetermined order, the predetermined order being one of an ascending and a descending numerical order;

a processor for calculating a current syndrome for said digital data; and

locating means for locating the predetermined syndrome contained in said table matching said current syndrome by using a predetermined search technique.

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## 5,491,701

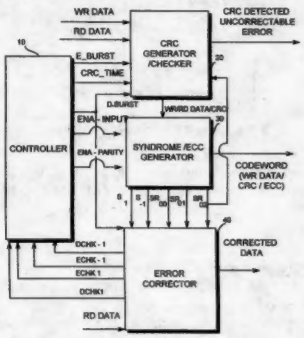
## BURST ERROR CORRECTOR

**Christopher P. Zook, Longmont, Colo., assignor to Cirrus Logic, Inc., Fremont, Calif.**

**Continuation-in-part of Ser. No. 148,068, Nov. 4, 1993, abandoned. This application Oct. 18, 1994, Ser. No. 325,850**

**Int. Cl.**[6] **G06F** *11/10*

**U.S. Cl. 371—39.1** **29 Claims**




1. An error correction system for detecting an error burst in a received codeword, the system comprising:

a CRC generator for generating check CRC bytes over data bytes of the codeword;

a syndrome generator which uses the data bytes of the codeword and CRC bytes of the codeword to generate syndromes and an error pattern;

a error corrector which uses the syndromes to determine the beginning of an error burst in the codeword and which uses the error pattern to correct the codeword;

a checker unit which uses the error pattern and the check CRC bytes generated by the CRC generator for verifying that the codeword is correctable.

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## 5,491,702

## APPARATUS FOR DETECTING ANY SINGLE BIT ERROR, DETECTING ANY TWO BIT ERROR, AND DETECTING ANY THREE OR FOUR BIT ERROR IN A GROUP OF FOUR BITS FOR A 25- OR 64-BIT DATA WORD

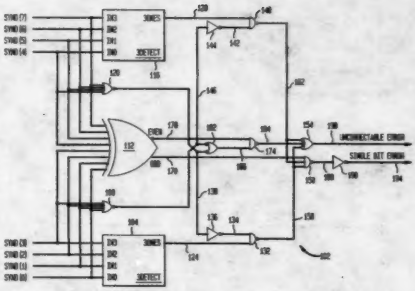
**John R. Kinsel, San Jose, Calif., assignor to Silicon Graphics, Inc., Mountain View, Calif.**

**Filed Jul. 22, 1992, Ser. No. 918,819**

**Int. Cl.**[6] **H03M** *13/00*

**U.S. Cl. 371—37.2** **117 Claims**

52. An apparatus for detecting data errors in a sixty-four bit block of data comprising:




syndrome calculating means for calculating an eight bit syndrome from the block of data, the syndrome including a first four-bit portion and a second four-bit portion;

a first three-ones detecting means, coupled to the syndrome calculating means, for detecting an occurrence of exactly three ones in the first four-bit portion of the syndrome;

a second three-ones detecting means, coupled to the syndrome calculating means, for detecting an occurrence of exactly three ones in the second four-bit portion of the syndrome;

a first ones detecting means, coupled to the syndrome calculating means, for detecting an occurrence of one or more ones in the first four bit portion of the syndrome;

a second ones detecting means, coupled to the syndrome calculating means, for detecting an occurrence of one or more ones in the second four-bit portion of the syndrome;

even ones detecting means, coupled to the syndrome calculating means, for detecting an occurrence of an even number of ones in the syndrome;

odd ones detecting means, coupled to the syndrome calculating means, for detecting an occurrence of an odd number of ones in the syndrome;

one-bit-error indicating means, coupled to the first three ones detecting means, to the second three ones detecting means, to the first ones detecting means, to the second ones detecting means, and to the odd ones detecting means, for providing a one-bit-error signal indicating an occurrence of one-bit errors within the block of data; and

uncorrectable error indicating means, coupled to the first three-ones detecting means, to the second three-ones detecting means, to the first ones detecting means, to the second ones detecting means, and to the even ones detecting means, for providing an uncorrectable-error signal indicating every occurrence of two-bit errors and three-bit and four-bit errors within a four-bit group of data bits within the block of data and distinguishing all three-bit errors from one-bit errors.

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## 5,491,703

## CAM WITH ADDITIONAL ROW CELLS CONNECTED TO MATCH LINE

**Catherine L. Barnaby, Coalpit Heath; Richard J. Gammack, St. James, and Anthony I. Stansfield, Hotwells, all of, United Kingdom, assignors to SGS-Thomson Microelectronics Ltd., United Kingdom**

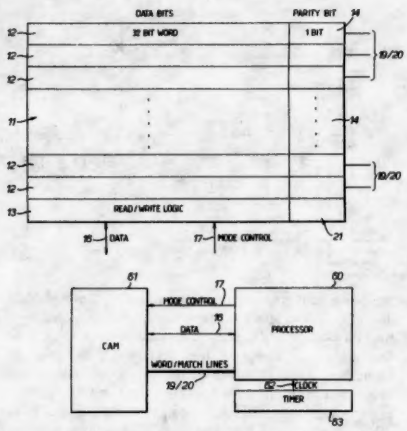
**Filed Jun. 29, 1993, Ser. No. 84,566**

**Claims priority, application United Kingdom, Jun. 30, 1992, 9213821**

**Int. Cl.**[6] **H03M** *13/00*

**U.S. Cl. 371—40.1** **9 Claims**

1. A method of accessing a content addressable memory having a plurality of RAM cells connected in an array of rows and columns, each row having a plurality of cells for storing a data word, at least one additional cell for storing a checking bit and a match line for providing a signal to indicate when a match occurs between an input data word and data stored in a row of cells, which method comprises storing in at least one row of cells a data word in data cells of the row and a checking bit in said at least one




additonal cell of the row, the checking bit having a value dependent on the content of the data word in accordance with an error checking system, and controlling a memory accessing system to effect an associate operation by inputting to the columns of cells an input word with an input checking bit dependent on said input word in accordance with the same error checking system, comparing the input word and input checking bit with stored contents of each row of cells and in any row where a mismatch of the input data word with the stored data word occurs causing at least two cells in that row to change a signal level on a match line for that row, said memory accessing system being arranged to operate with a time delay for each associate operation which is less than that required for a single cell mismatch.

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**5,491,704**

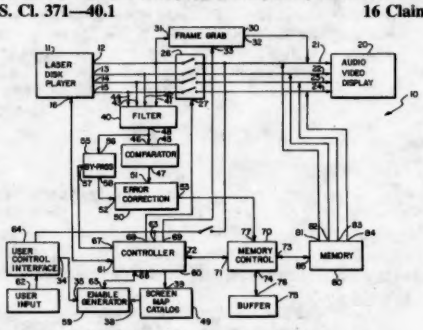
**INTERACTIVE LASER DISC SYSTEM**

**James R. Duron, Dana Point, Calif., assignor to Quantum Lerning Systems, Inc., Ocala, Fla.**

**Filed Oct. 21, 1993, Ser. No. 140,264**

**Int. Cl.[6] H03M** *13/00;* **G11B** *5/04;15/52;* **H04N** *5/76*

**U.S. Cl. 371—40.1** **16 Claims**




1. An interactive laser disc system comprising:

a laser disc having a plurality of data segments stored thereon each having an instruction data portion each of which includes a multiple number of identical instructions repeated in succession and an event data portion including pluralities of audio visual events, said data segments being associated into groups of alternative user options;

a laser disc player having means for receiving said laser disc and recovering said data segments therefrom;

display means for producing an audio visual display;

a controller having a controller memory for controlling the operation of said laser disc player and for presenting a plurality of user choice options upon said display means and for storing a group of said data segments in said controller memory;

a comparator for examining each data segment and matching said identical instructions;

input means for receiving a user choice from among said options; and

said controller responding to said user choice to retrieve a corresponding one of said data segments from said controller memory and applying it to said display means thereby providing an interactive display.

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**5,491,705**

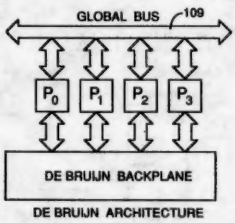
**DE BRUIJN GRAPH BASED VLSI VITERBI DECODER**

**Dhiraj K. Pradhan, and Nitin H. Vaidya, both of Amherst, Mass., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.**

**Filed Jun. 18, 1992, Ser. No. 904,341**

**Int. Cl.[6] H03M** *13/12*

**U.S. Cl. 371—43** **1 Claim**




DE BRUIJN ARCHITECTURE

1. A system for decoding a convolutional code (n, k, m), where k is the input, n is the output and m is the input memory, said code being supplied to a generator matrix $G(D)=(1+D,\ 1+D^2,\ +D+D_2)$ where D and D2 are delay elements equal in number to m, comprising:

a DeBruijn graph having $2^m$ nodes, each of said nodes corresponding to one of four states **00**, **01**, **10**, and **11** of a Viterbi decoder, each of said nodes having one input and two outputs, wherein k=1, m=2 and n=3.0;

a plurality of Viterbi trellis decoders for decoding said convolutional code, one trellis decoder being embedded in each of said nodes, each trellis decoder having a plurality of arcs, every arc in the trellis of each Viterbi decoder providing a connection corresponding to each of said nodes.

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**5,491,706**

**DISPLAY-INTEGRATED TYPE TABLET DEVICE CAPABLE OF DETECTING CORRECT COORDINATES AT A TIP END OF A DETECTION PEN BY DETECTING EXTERNAL NOISE**

**Takao Tagawa, Kashihara; Hitoshi Nohno, Osaka; Kiyohiro Nozaki, Yao, and Kazunari Okamura, Kitakatsuragi, all of, Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan**

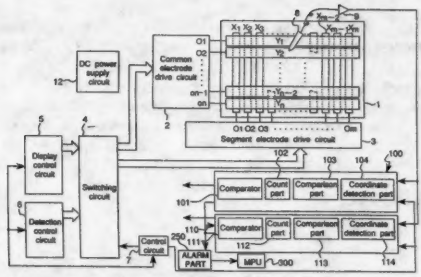
**Filed Apr. 5, 1994, Ser. No. 222,907**

**Claims priority, application Japan, Apr. 7, 1993, 5-080473; Apr. 13, 1993, 5-086118**

**Int. Cl.[6] G06F** *11/00*

**U.S. Cl. 371—57.2** **5 Claims**

1. A display-integrated type tablet device including a display panel having first electrodes arranged in parallel in one direction and second electrodes arranged in parallel in another direction perpendicular to the one direction, a detection pen having at a tip end a detection electrode electrostatically coupled with the first electrodes and the second electrodes, a first drive circuit for driving the first electrodes, a second drive circuit for driving the second electrodes, a display control circuit for displaying an image on the display panel by controlling the first drive circuit and the second drive circuit in an image display period, a detection control circuit




for controlling the first drive circuit and the second drive circuit in a coordinate detection period so as to apply a scanning voltage to the first electrodes and the second electrodes to sequentially scan the first and second electrodes, and a coordinate detection circuit for detecting coordinates at a point pointed by the tip end of the detection pen according to a timing of generation of an output signal from the detection pen and a timing of scanning the first electrodes or the second electrodes, the display-integrated type tablet device comprising:

count means which counts a total number of times when the output signal output from the detection pen in the coordinate detection period exceeds a threshold level; and

error detection determination means which compares a count number obtained by the count means in one coordinate detection period with the number of times of scanning the electrodes in the one coordinate detection period by means of the detection control circuit, and determines that, when the count number is greater than the number of times of scanning, error detection coordinates are included in coordinates on the display panel detected by the coordinate detection circuit in the coordinate detection period.

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**5,491,707**

## LOW COST, HIGH AVERAGE POWER, HIGH BRIGHTNESS SOLID STATE LASER

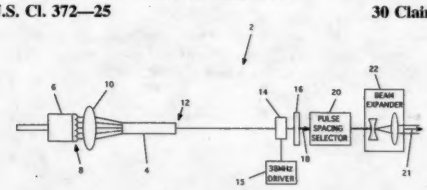
**Harry Rieger; Henry Shields, both of San Diego, and Richard M. Foster, Manhattan Beach, all of Calif., assignors to Jamar Technologies Co., San Diego, Calif.**

**Continuation-in-part of Ser. No. 295,283, Aug. 24, 1994, Pat. No. 5,434,875. This application Nov. 15, 1994, Ser. No. 339,755**

**The portion of the term of this patent subsequent to Jul. 18, 2012, has been disclaimed.**

**Int. Cl.[6] H01S** *3/10*

**U.S. Cl. 372—25** **30 Claims**




1. A high average power, high brightness solid state pulse laser system comprising:

a) a seed laser subsystem means for producing a seed pulse laser beam with a pulse frequency in excess of 1,000 pulses per second each pulse having a duration of less than 1 ns,

b) a laser amplifier means for amplifying said seed pulse laser beam to produce an amplified pulse laser beam comprising high frequency pulses, said amplified pulse laser beam having an average power in excess of 10 Watts,

c) a focusing means for focusing said amplified pulse laser beam to a small spot size on a target, said spot size being small enough to produce a brightness level in excess of $10^{11}$ W/cm$^2$.

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**5,491,708**

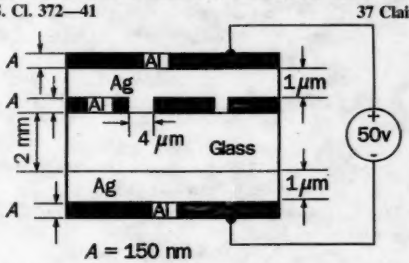
## INTEGRATED OPTIC LASER

**Kevin J. Malone, Boulder, Colo.; Joseph S. Hayden, Clarks Summit, Pa.; Norman A. Sanford, and John A. Aust, both of Boulder, Colo., assignors to The United States of America as represented by the Secretary of Commerce, Washington, D.C.**

**Continuation-in-part of Ser. No. 11,653, Feb. 1, 1993, Pat. No. 5,334,554. This application Feb. 1, 1994, Ser. No. 189,553**

**Int. Cl.[6] H01S** *3/16;* **G02B** *6/00;* **C03C** *15/00;* **C03B** *27/00*

**U.S. Cl. 372—41** **37 Claims**




1. A laser waveguide medium comprising:

a laser glass substrate wherein said substrate is a glass comprising (on an oxide composition basis):

| | Mole % |
|---|---|
| $P_2O_5$ | 50–70 |
| $Al_2O_3$ | 4–13 |
| $Na_2O$ | 10–35 |
| $La_2O_3$ | 0–6 |
| $Ln_2O_3$ | >0–6 |
| R'O | 0–20 |
| $R_2O$ | 0–18 |

wherein $Ln_2O_3$ is the sum of the lanthanide oxides of atomic numbers 58–71, R'O is the sum of oxides of Mg, Ca, Cr, Ba, Zn and Pb, and $R_2O$ is the sum of oxides of Li, K, Rb and Cs; and

a waveguide region embedded in said substrate, said waveguide region having a higher refractive index than said substrate and said waveguide region having an inlet region through which light can enter and an outlet region through which light can exit.

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**5,491,709**

## SEMICONDUCTOR LASER DEVICE

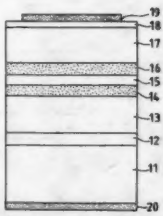
**Yasuji Seko; Hiromi Otoma; Nobuaki Ueki; Hideki Fukunaga; Hideo Nakayama; Kiichi Ueyanagi, all of Kanagawa, and Yasuhiro Shiraki, Tokyo, all of, Japan, assignors to Fuji Xerox Co., Ltd., and Yasuhiro Shiraki, both of Tokyo, Japan**

**Filed Aug. 16, 1993, Ser. No. 106,700**

**Claims priority, application Japan, Aug. 20, 1992, 4-221089**

**Int. Cl.[6] H01S** *3/19*

**U.S. Cl. 372—45** **18 Claims**



1. A semiconductor laser device, comprising:

an active layer; and

clad layers respectively disposed at both sides of said active layer, wherein

said clad layers comprise

a pair of first clad layers each having a greater band gap than said active layer and having a thickness of not more than 0.3 μm, and

a pair of second clad layers each having a lower refractive index than said active layer, and wherein

said pair of first clad layers are disposed nearer to said active layer than said pair of second clad layers.

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**5,491,710**

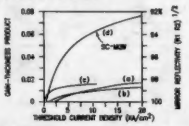
**STRAIN-COMPENSATED MULTIPLE QUANTUM WELL LASER STRUCTURES**

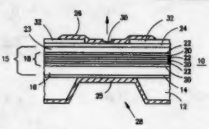
**Yu-Hwa Lo, Ithaca, N.Y., assignor to Cornell Research Foundation, Inc., Ithaca, N.Y.**

**Filed May 5, 1994, Ser. No. 238,500**

**Int. Cl.[6] H01S** *3/085;3/06;3/18*

**U.S. Cl. 372—45** **10 Claims**





1. A semiconductor vertical cavity surface emitting laser structure comprising:

a) a substrate;

b) a laser body on said substrate;

c) a strain-compensated multiple quantum well structure in said laser body and forming a gain medium for said laser structure; and

d) first and second reflective means positioned below and above, respectively, said strain-compensated multiple quantum well structure for forming a vertical cavity for said laser structure in said laser body.

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**5,491,711**

**SEMICONDUCTOR LASER DEVICE**

**Ranjit S. Mand, San Jose, Calif.; Tetsuro Ijichi, Yokohama, Japan, and Jingming Xu, Oakville, Canada, assignors to The Furukawa Electric Co., Ltd., Tokyo, Japan**

**Filed Nov. 4, 1993, Ser. No. 145,835**

**Int. Cl.[6] H01S** *3/19*

**U.S. Cl. 372—49** **2 Claims**

1. A semiconductor laser device comprising a body having opposed facets, said body comprising an InGaAs/GaAs active region with portions of said active region along said facets having a thin film material of aluminum or phosphorus diffused therein.

**5,491,712**

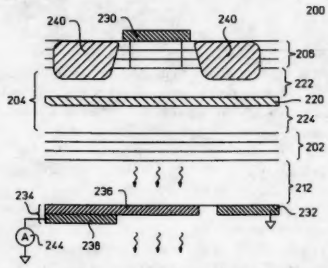
**INTEGRATION OF SURFACE EMITTING LASER AND PHOTODIODE FOR MONITORING POWER OUTPUT OF SURFACE EMITTING LASER**

**Hong Lin, 914 Colorado Ave., Palo Alto, Calif. 94303; Long Yang, 5122 Seaside Ct., Union City, Calif. 94587; Michael R. T. Tan, 315 Citton St., Menlo Park, Calif. 94025, and Shih-Yuan Wang, 766 Encina Grande, Palo Alto, Calif. 94306**

**Filed Oct. 31, 1994, Ser. No. 332,231**

**Int. Cl.[6] H01S** *3/18*

**U.S. Cl. 372—50** **18 Claims**




1. An integrated light emitting device and photodetecting device comprising:

an active region including a light generation region for generating light in response to light passing therethrough, the active region having a first side and a second opposite side, the light generation region emitting light in a first direction through a first surface;

a second mirror region having a first side and a second opposite side, the second mirror region for reflecting light towards the light generation region, the second mirror region being located on the first side of the active region;

a first mirror region having a first side and a second opposite side, the first mirror region for reflecting light towards the light generation region, the first side of the first mirror region being located on the second side of the active region;

a substrate having a first side and a second opposite side, the first side of the substrate being located on the second side of the first mirror region; and

a Schottky contact for detecting light emitted in the first direction, the Schottky contact being formed on the first surface.

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**5,491,713**

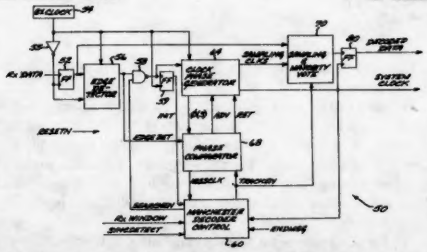
**MINIMIZED OVERSAMPLING MANCHESTER DECODER**

**Peter W. Kwok, La Palma; Ira R. Feldman, Fullerton, and Douglas A. Dwyer, Brea, all of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.**

**Filed Apr. 28, 1993, Ser. No. 56,015**

**Int. Cl.[6] H03D** *3/00;* **H04L** *27/22*

**U.S. Cl. 375—333** **23 Claims**



1. A decoder circuit for decoding incoming Manchester-encoded digital data characterized by an incoming data rate, wherein there

is a mid-bit transition in the center of each Manchester data bit, the mid-bit transition occurring between half-bits, the decoder circuit comprising:

means for supplying noninverted and inverted versions of an encoder clock signal, said clock signal having an oversampling rate greater than said incoming data rate;

means for sampling said incoming Manchester-encoded digital data to provide samples of said incoming data, said sampling means clocked by said inverted encoder clock signal;

means responsive to said incoming data samples for detecting a change of state between successive data samples and providing a state change signal indicating that a change of state has been detected between successive data samples, said detecting means clocked by said inverted encoder clock signal;

means responsive to said state change signal for generating a system clock signal synchronized to said incoming data, and for generating a plurality of clock phase signals which mark preselected phases of said system clock signal, said generating means clocked by said noninverted oversampling clock; and

decoding means responsive to said data samples and said clock phase signals for sampling the data samples such that each incoming Manchester data bit is sampled at at least three intervals set by said clock phase signals, said decoding means providing a decoded data value for the data samples in dependence on at least three interval sample values of said data sample, said decoding means comprising majority vote means for assigning said decoded data value as the value of the majority of said at least three interval sample values.

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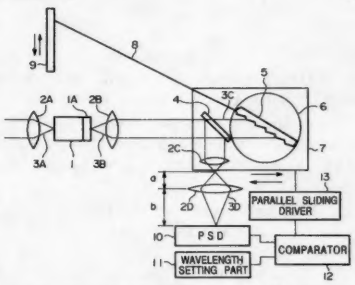
## 5,491,714
## WAVELENGTH-VARIABLE SEMICONDUCTOR LASER LIGHT SOURCE

**Atsushi Kitamura, Tokyo, Japan, assignor to Ando Electric Co., Ltd., Tokyo, Japan**

**Filed Feb. 15, 1995, Ser. No. 389,039**
**Claims priority, application Japan, Feb. 28, 1994, 6-054580**
**Int. Cl.[6] H01S** *3/08*
**U.S. Cl. 372—92** **3 Claims**




1. A wavelength-variable semiconductor laser light source comprising:

a semiconductor laser whose one end face is coated with an antireflection film;

a parallel sliding stage which moves in parallel with the optical axis of the semiconductor laser by a parallel sliding driver;

a beam splitter, fixed on the parallel sliding stage, for splitting outgoing light From the end face coated with the antireflection film into transmitted light and reflected light;

a diffraction grating fixed on a rotating stage which is provided on the parallel sliding stage, the diffraction grating for inputting the transmitted light from the beam splitter so as to form an external resonator with the other end face of the semiconductor laser;

a transformation mechanism for transforming the parallel motion of the parallel sliding stage into the rotational motion of the rotating stage;

a lens for expanding the reflected light from the beam splitter;

a PSD for inputting the expanded light from the lens and outputting an electric signal which is proportional to an amount of the displacement of the expanded light, the displacement being caused by the parallel movement of the parallel sliding stage;

a wavelength setting part for arbitrarily setting the oscillation wavelength of the semiconductor laser; and

a comparator for comparing a set signal from the wavelength setting part with the electric signal from the PSD and feeding the result of the comparison back to the parallel sliding driver.

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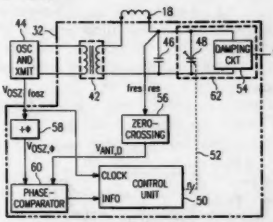
## 5,491,715
## AUTOMATIC ANTENNA TUNING METHOD AND CIRCUIT

**Thomas J. Flaxl, Train, Germany, assignor to Texas Instruments Deutschland GmbH, Germany**

**Filed Jun. 28, 1993, Ser. No. 83,810**
**Int. Cl.[6] H04L** *27/06*
**U.S. Cl. 375—344** **33 Claims**




1. A method of matching a resonant frequency of an antenna resonant circuit to an output frequency of a transmitter output stage, the method comprising the steps of:

a) providing a powering signal from said transmitter output stage to said antenna resonant circuit;

b) receiving at said antenna resonant circuit said powering signal, said antenna resonant circuit comprising a tuning circuit, said tuning circuit being operable to variably modify said resonant frequency of said resonant circuit, said antenna resonant circuit having at its output a phase correlation signal, the phase of said phase correlation signal relative to said powering signal having a known relationship to a frequency difference between said resonant frequency and said powering signal;

c) receiving in a phase comparator said powering signal and said phase correlation signal; and

d) adjusting the resonant frequency of said resonant circuit in response to a received output of said phase comparator.

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## 5,491,716
## WEIGHT-VALUE CONTROLLED ADAPTIVE PROCESSOR FOR SPREAD SPECTRUM RECEIVER

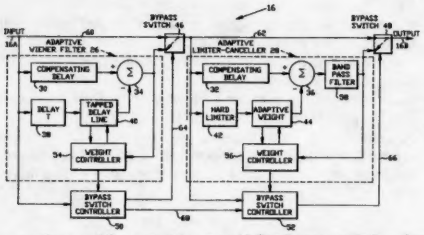
**James W. Bond, San Diego, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed Jun. 18, 1990, Ser. No. 563,907**
**Int. Cl.[6] H04B** *1/69; 1/10*
**U.S. Cl. 375—200** **10 Claims**

7. An adaptive processor for a spread spectrum receiver, said adaptive processor having an input and an output and a conducting path connecting said input and said output, said adaptive processor comprising:

(a) first and second bypass switches connected in series in said conducting path between said input and said output of said processor, each of said bypass switches having first and second switched positions;

(b) an adaptive Wiener filter connected between said input and said first bypass switch for receiving and processing an input signal which contains communicating and interfering signal




portions and for outputting to said first bypass switch a signal having a reduced interfering portion, said Wiener filter also for producing a control signal having a first state if said interfering signal portion is being successfully reduced and a second state if said interfering signal portion is not being successfully reduced;

(c) a first bypass switch controller connected to said input, said Wiener filter, and said first bypass switch, said first bypass switch controller for receiving said control signal from said Wiener filter and for activating said first bypass switch to said first or second switched position to correspondingly connect said Wiener filter in or out of said conducting path to said second bypass switch depending upon whether said control signal is in said first or second state;

(d) an adaptive limiter-canceller connected to said input via said first bypass switch for receiving and processing an input signal which contains communicating and interfering signal portions and for outputting a signal with a reduced interfering portion, said limiter-canceller also for producing a control signal having a first state if said interfering signal portion is being successfully reduced and a second state if said interfering signal portion is not being successfully reduced; and

(e) a second bypass switch controller connected to said second bypass switch, said limiter-canceller and said input via said first bypass switch and said first bypass switch controller, said second bypass switch controller for receiving said control signal from said limiter-canceller and for activating said second bypass switch to said first or second switched position to correspondingly connect said limiter-canceller in or out of said conducting path to said output depending upon whether said control signal is in said first or second state.

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**5,491,717**

## METHOD FOR CONTROLLING TRANSMISSION DURING HANDOFF IN A COMMUNICATION SYSTEM

**Scott M. Hall, Fort Worth, Tex., assignor to Motorola, Inc., Schaumburg, Ill.**

**Filed Oct. 18, 1993, Ser. No. 137,334**
**Int. Cl.[6] H04J** *13/02;13/04;* **H04Q** *7/22*
**U.S. Cl. 375—205** **23 Claims**

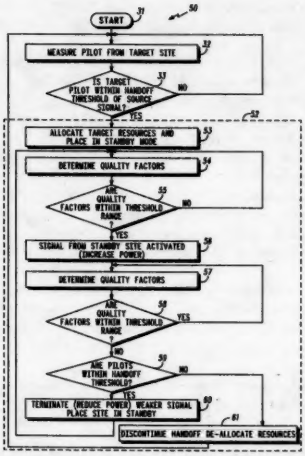
**23**. A method of controlling transmission during handoff in a communication system, said method comprising the steps of:

A) measuring a first handoff quality factor of a transmission between a source transceiver and a subscriber, a second handoff quality factor of a signal between a first target transceiver said subscriber, and a third handoff quality factor of a signal between a second target transceiver and said subscriber;

B) allocating resources at said first or second target transceivers for communication with said subscriber unit if said second or third handoff quality factors, respectively, meet a handoff threshold of said first handoff quality factor;

C) measuring a first received signal quality factor of said signal between said subscriber and said source transceiver, a second received quality factor of said signal between said subscriber and said first target transceiver, and a third received quality factor of said signal between said subscriber and said second target transceiver;

D) increasing a transmission power from said first or second target transceiver to said subscriber if said transmission power from said first or second target transceivers, respectively, are




below a normal power level and said second or third received signal quality factors, respectively, meet a received signal quality threshold of said first received signal factor;

E) reducing a transmission power from said source transceiver to said subscriber if said transmission power from said source transceiver is at; or exceeds, said normal power level and said first received signal quality factor is worse than said second or third received signal quality factor and fails to meet said received signal quality threshold of said same second or third received signal quality factor; and

F) de-allocating resources at said source transceiver for communication with said subscriber unit if said first handoff quality factor fails to meet said handoff threshold of said same second or third handoff quality factor.

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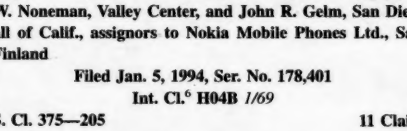
**5,491,718**

## CDMA RADIOTELEPHONE HAVING OPTIMIZED SLOTTED MODE AND LONG CODE OPERATION

**Adam F. Gould; James R. Robertson, both of San Diego; John W. Noneman, Valley Center, and John R. Gelm, San Diego, all of Calif., assignors to Nokia Mobile Phones Ltd., Salo, Finland**

**Filed Jan. 5, 1994, Ser. No. 178,401**
**Int. Cl.[6] H04B** *1/69*
**U.S. Cl. 375—205** **11 Claims**


UPPER LAYERS (PRIMARY TRAFFIC)
UPPER LAYERS (SECONDARY TRAFFIC)
LAYER 3 (MOBILE STATION CONTROL PROCESSES)
LAYER 2 (PRIMARY TRAFFIC)
LAYER 2 (SECONDARY TRAFFIC)
LAYER 2 (SIGNALING)
LAYER 2 (LINK LAYER) (PAGING & ACCESS CHANNELS)
LAYER 2 (SYNC CHANNEL)
MULTIPLEX SUBLAYER (TRAFFIC CHANNEL)
LAYER 1 (PHYSICAL LAYER)

1. For use in a radiotelephone system, a method of operating a radiotelephone in a discontinuous reception mode, comprising the steps of:

periodically activating at least a portion of a radiotelephone to receive a transmission, wherein a time period between periodic activations of the radiotelephone is predetermined to be a function of an integer multiple of a radiotelephone system time constant and also an integer multiple of a smallest partition of a transmission period; and

receiving at least a portion of the transmission during a period subsequent to each periodic activation.

## 5,491,719

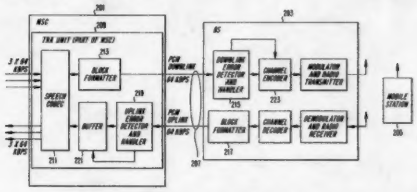
### SYSTEM FOR HANDLING DATA ERRORS ON A CELLULAR COMMUNICATIONS SYSTEM PCM LINK

**Patrik C. Sellin, Upplands Väsby; Örjan P. S. Fall, Sollentuna; Anders K. Molin, Solna, and Lars J. Wilhelmsson, Sundbyberg, all of, Sweden, assignors to Telefonaktiebolaget LM Ericsson, Stockholm, Sweden**

**Filed Jul. 2, 1993, Ser. No. 85,044**

**Int. Cl.[6] H04B** *3/46;* **G06F** *11/00;* **H04M** *11/00*

**U.S. Cl. 375—213** **15 Claims**



**1**. In a digital cellular communication system including a switching unit coupled to a base station by means of a bidirectional pulse code modulation (PCM) link, the switching unit including a speech codes for coding downlink speech signals and decoding uplink speech signals that are respectively transmitted to and received from the base station by means of the PCM link, the PCM link conveying encoded downlink and uplink speech and control data in respective downlink and uplink blocks, the base station operating to relay an encoded downlink speech signal received from the switching unit to a mobile station by means of transmission on a radio channel and to relay to the switching unit an encoded uplink speech signal received from the mobile station by means of transmission on the PCM link, the base station further operating to send a defined control message to the mobile station by means of transmission on the radio channel when it is desired to send a command to the mobile station, said transmission of the defined control message occurring in place of the transmission to the mobile station of the encoded downlink speech signal, a system for handling errors in a transmitted block, comprising:

in the base station, input means for receiving a signal indicative of existence of an error in a received downlink block; and

in the base station, downlink error handling means coupled to the input means, for discarding a received downlink block in response to the signal indicating existence of an error therein, and for substituting therefor a default control message to be relayed to the mobile station, the default control message having no meaning defined by the digital cellular communications system, whereby the mobile station, in response to receiving the default control message, performs no operation other than a bad frame masking operation.

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## 5,491,720

### METHOD AND SYSTEM FOR AUTOMATICALLY DETERMINING DATA COMMUNICATION DEVICE TYPE AND CORRESPONDING TRANSMISSION RATE

**Gordon T. Davis, Raleigh, N.C.; Judith M. Linger, Delray Beach, Fla.; Baiju D. Mandalia, Boca Raton, Fla.; John C. Sinibaldi, Pompano Beach, Fla.; William M. Zevin, Boca Raton, Fla., and Karl-Heinz Ziegenhain, Wiesbaden, Germany, assignors to International Business Machines Corporation, Armonk, N.Y.**

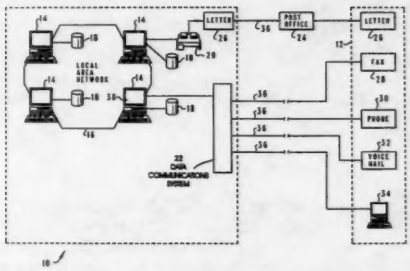
**Filed May 21, 1992, Ser. No. 887,433**

**Int. Cl.[6] H04B** *1/38*

**U.S. Cl. 375—222** **20 Claims**

**11**. A data communication system for automatically determining a data communication device type and a transmission speed associated with said data communication device type, wherein said data communication system comprises:

a first data communication device and at least a second data communication device couplable to said first data communication device over a transmission line;



means for initiating transmission in a first communication protocol of a sequence of different signals from said first data communication device via said transmission line at predetermined intervals;

means for monitoring said transmission line for an occurrence of a response signal from said second data communication device;

means for initiating the response signal from said second data communication device in response to receipt of a particular signal within said sequence of different signals; and

means for utilizing a relationship between said occurrence of said response signal and the transmission of said sequence of different signals to determine the data communication device type and the transmission speed for said second data communication device, wherein data communications may be established between said first data communication device and said second data communication device at an optimal transmission speed.

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## 5,491,721

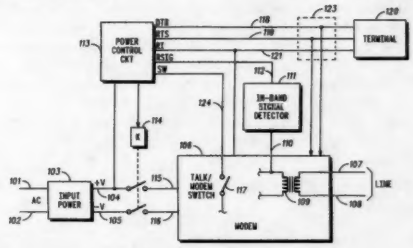
### MODEM POWERING METHOD AND APPARATUS

**Gurley D. Cornelius, Toney, and Randell C. Frost, Gurley, both of Ala., assignors to Motorola, Inc., Schaumburg, Ill.**

**Filed Feb. 23, 1994, Ser. No. 200,791**

**Int. Cl.[6] H04B** *1/38*

**U.S. Cl. 375—222** **17 Claims**



**12**. A modem powering apparatus, the modem having a plurality of operating modes, including a calling mode, a manual mode, an answer mode, a transmit mode, and a receive mode, the modem powering apparatus including a modem arranged for coupling to a terminal and a line, a relay arranged for controlling the power flow to the modem, and a power control circuit;

the power control circuit arranged for determining when no modem activity is present for at least one of said plurality of operating modes;

the power control circuit further arranged for releasing the relay and thus powering-down the modem when no modem activity is present;

the power control circuit further arranged for determining when modem activity has returned for at least one of said plurality of operating modes;

the power control circuit further arranged for operating the relay and thus powering-up the modem when modem activity has returned; and

after modem activity has returned, the power control circuit further arranged for waiting for the modem to stabilize before continuing normal modem activity.

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## 5,491,722

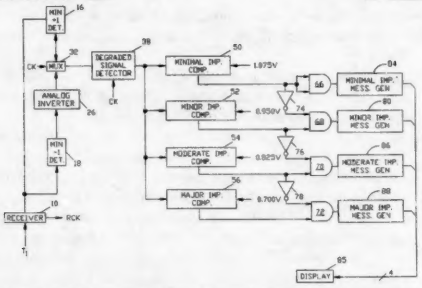
## EYE PATTERN MARGIN MEASUREMENT AND RECEIVER STRESS DETECTION DEVICE

**David E. Jones, Huntsville; Robert E. Gewin, Rogersville, and Ronald W. Jackson, Huntsville, all of Ala., assignors to Communications Technology Corporation, Dallas, Tex.**

**Filed Dec. 21, 1992, Ser. No. 993,672**

**Int. Cl.[6] H04B** *3/46*

**U.S. Cl. 375—224** **19 Claims**




1. A system for monitoring communications signals comprising:

signal discrimination means responsive to communications signals, for separately providing at least one value indicative signal responsive to, and representative of, values of at least one discrete characteristic type of communications signal;

at least one degraded signal detection means including signal generating means for generating a variable value reference, and driving means responsive to a said value indicative signal for driving said signal generating means, and thereby a value of said variable value reference toward a value of a said discrete characteristic type of communications signal, said driving means being most responsive to said value indicative signal which is of a value indicative of a greater degradation than a value of said variable value reference; and

at least one reference comparison means responsive to said variable value reference resulting from said discrete characteristic type of communications signal, and a discrete nominal signal value for providing an output indicative of a degree of impairment of said characteristic type of communications signal.

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## 5,491,723

## WIRELESS COMMUNICATION SYSTEM HAVING ANTENNA DIVERSITY

**Wilhelmus J. M. Diepstraten, Diessen, Netherlands, assignor to NCR Corporation, Dayton, Ohio**

**Filed Apr. 14, 1994, Ser. No. 209,099**

**Claims priority, application United Kingdom, May 6, 1993, 9309353**

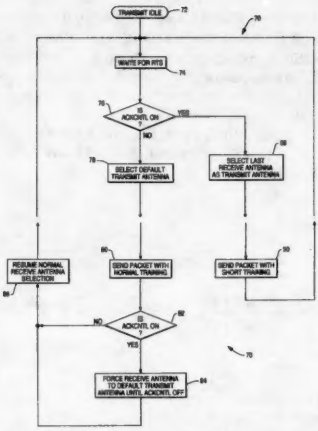
**Int. Cl.[6] H04B** *7/02;* **H04L** *1/02*

**U.S. Cl. 375—267** **7 Claims**

1. A wireless communication system, comprising:

a first station having a first plurality of antennas, said first station further having a first antenna select switching means which is controlled to select a default antenna of the first plurality of antennas for transmitting an information packet; and

a second station having a second plurality of antennas, said second station further having a second antenna select switching means which is controlled to select a second antenna of the second plurality of antennas to receive the transmitted information packet at said second station,




wherein said second switching means is controlled to enable transmission of a response packet utilizing said second antenna after receipt of the transmitted information packet in response to the second antenna being selected to receive the transmitted information packet, and

wherein said first switching means is controlled to enable receipt of the transmitted response packet utilizing said default antenna in response to the default antenna being selected to transmit the information packet.

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## 5,491,724

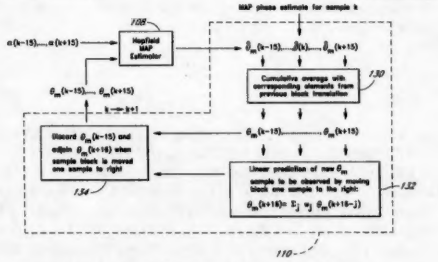
## MEAN PHASE PREDICTOR FOR MAXIMUM A POSTERIORI DEMODULATOR

**Richard A. Altes, La Jolla, Calif., assignor to Chirp Corporation, La Jolla, Calif.**

**Continuation-in-part of Ser. No. 607,582, Nov. 1, 1990, Pat. No. 5,303,269. This application Apr. 11, 1994, Ser. No. 225,759**

**Int. Cl.[6] H03D** *3/00*

**U.S. Cl. 375—322** **16 Claims**


MAP phase estimate for sample k
108
Hopfield MAP Estimator
110
130
132
134
Cumulative average with corresponding elements from previous block translation
Discard and obtain when sample block is moved one sample to right
Linear prediction of new sample to be observed by moving block one sample to the right:

1. A maximum a posteriori demodulator, comprising:

a maximum a posteriori (MAP) estimator receiving a block of N phase samples $\{\alpha(\Delta), \ldots, \alpha(N\Delta)\}$ and a block of N prior mean phase estimates $\{\theta_m(\Delta), \ldots, \theta_m(N\Delta)\}$, wherein the estimator generates a block of N phase estimates $\{\hat{\theta}(\Delta), \ldots, \hat{\theta}(N\Delta)\}$; and

a mean phase predictor, comprising:

a cumulative averager receiving the block of phase estimates $\{\hat{\theta}(\Delta), \ldots, \hat{\theta}(N\Delta)\}$ and averaging the block with corresponding elements from previous block averages so as to provide the block of prior mean phase estimates $\{\theta_m(\Delta), \ldots, \theta_m(N\Delta)\}$;

a linear predictor receiving the prior mean phase estimates $\{\theta_m(\Delta), \ldots, \theta_m(N\Delta)\}$ and predicting a new prior mean phase estimate $\theta_m[(N+1)\Delta]$; and

a shift register receiving the prior mean estimates $\{\theta_m(\Delta), \ldots, \theta_m(N\Delta)\}$ and new prior mean phase estimate $\theta_m[(N+1)\Delta]$ such that the first in time prior mean estimate $\theta_m(\Delta)$ is shifted out and a new block of prior mean phase estimates $\theta_m(2\Delta), \ldots, \theta_m[(N+1)\Delta]$ is provided to the MAP estimator at time $(N+1)\Delta$.

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**5,491,725**

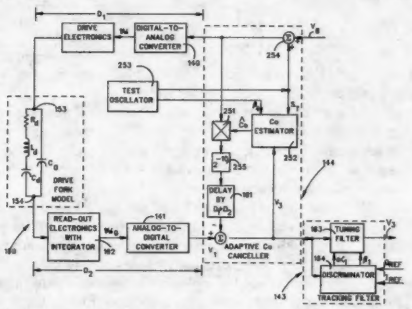
## TRACKING FILTER AND QUADRATURE-PHASE REFERENCE GENERATOR

**Stanley A. White, San Clemente, Calif., assignor to Rockwell International Corporation, Seal Beach, Calif.**

**Filed Sep. 7, 1993, Ser. No. 116,859**

**Int. Cl.[6] H04L** *27/14*

**U.S. Cl. 375—324** **13 Claims**




**5**. A tracking filter comprising:

(a) a tunable filter responsive to an input signal for producing a filtered signal on an output, said tunable filter having an adjustable passband center frequency responsive to a frequency control signal;

(b) a reference signal generator having an input connected to said output for producing an in-phase reference signal and a quadrature-phase reference signal in response to said filtered signal; and

(c) a frequency discriminator responsive to said input signal and connected to said reference signal generator and said tunable filter for producing said frequency control signal by complex demodulation of said input signal with said in-phase reference signal and said quadrature-phase reference signal;

wherein said tunable filter is responsive to a passband-width control signal, and said frequency discriminator includes means for generating said passband-width control signal.

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**5,491,726**

## METHOD AND APPARATUS TO DETERMINE THE FREQUENCY AND TIME SLOT POSITION IN A DIGITAL WIRELESS COMMUNICATION SESSION

**Jong-Keung Cheng, Danville; Nan-Sheng Lin, Union City, and Mihran H. Touriguian, Hercules, all of Calif., assignors to TCSI Corp., Berkeley, Calif., and Sharp Corporation, Chiba, Japan**

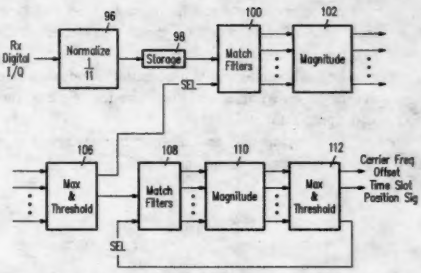
**Filed Aug. 17, 1993, Ser. No. 107,938**

**Int. Cl.[6] H03D** *3/00;* **H04L** *27/22*

**U.S. Cl. 375—343** **17 Claims**

**1**. A digital wireless communication system for communicating between a first unit and a second unit, wherein said first unit transmits a digitally encoded signal at a first frequency, and wherein said transmission is subject to deviation in frequency upon arrival at said second unit, said second unit comprising:

antenna means for receiving said digitally encoded signal;




means for sampling said digitally encoded signal to produce a first sampled digital signal;

a plurality of first digital filter means for receiving said first sampled digital signal simultaneously, each of said first digital filter means being a match filter tuned to a frequency range different from one another for producing a plurality of second sampled digital signals with each having an amplitude;

means for receiving said plurality of second sampled digital signals and for selecting the second sampled digital signal with the largest amplitude, and for selecting the first digital filter means producing said selected second sampled digital signal;

a plurality of second digital filter means for receiving said selected second sampled digital signal simultaneously, each of said second digital filter means being a match filter tuned to a frequency range different from one another for producing a plurality of third sampled digital signals with each having an amplitude; and

means for receiving said plurality of third sampled digital signals and for selecting the third sampled digital signal with the largest amplitude and for selecting the second digital filter means producing said selected third sampled digital signal.

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**5,491,727**

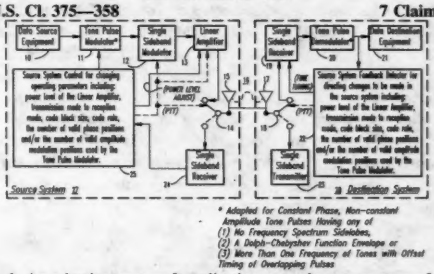
## APPARATUS USEFUL IN RADIO COMMUNICATION OF DIGITAL DATA USING MINIMAL BANDWIDTH

**Raymond C. Petit, Oak Harbor, Wash., assignor to Hal Communications Corp., Urbana, Ill.**

**Division of Ser. No. 726,842, Jul. 8, 1991, Pat. No. 5,253,270. This application Aug. 30, 1993, Ser. No. 113,861**

**Int. Cl.[6] H04L** *7/00*

**U.S. Cl. 375—358** **7 Claims**




* Adapted for Constant Phase, Non-constant Amplitude Tone Pulses Having any of (1) No Frequency Spectrum Sidelobes, (2) A Dolph–Chebyshev Function Envelope or (3) More Than One Frequency of Tones with Offset Timing of Overlapping Pulses

**1**. An adaptive system for adjusting operating parameters of a transmitter used for transmitting digital data which system is operable over marginal signal paths at high ratios of bit rate per occupied bandwidth comprising:

a transmitter for transmitting said digital data, said transmitter including:

adjusting means for adjusting the operating parameters of said transmitter in response to optimal operating parameter data transmitted from a receiver receiving said digital data, by selecting a data encoding format of said transmitted digital data;

a receiver for receiving said digital data separated from said transmitter by a signal path, said receiver including:

means for determining a quality of said signal path from at least two different reception parameters associated with said received digital data;

means for determining optimal operating parameters of said transmitter based upon said determination of the quality of said signal path; and

means for relaying said optimal operating parameter data to said transmitter over said signal path.

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## 5,491,728

## CELL RESEQUENCING SYSTEM FOR A TELECOMMUNICATION NETWORK

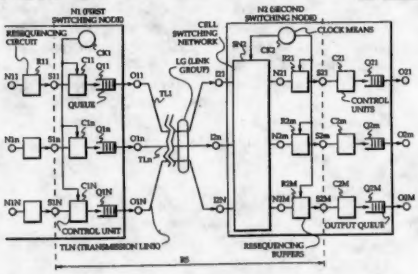
**Henri A. J. Verhille; Michel A. R. Henrion, both of Brussels; Michel P. M. De Somer, Kontich, and Bart J. G. Pauwels, Borgerhout, all of, Belgium, assignors to Alcatel N.V., Netherlands**

**Filed Sep. 17, 1993, Ser. No. 123,513**

**Claims priority, application European Pat. Off., Sep. 18, 1992, 92202866**

**Int. Cl.[6] H04L** *7/00;* **G06K** *5/04*

**U.S. Cl. 375—362** **18 Claims**




1. A cell resequencing system for a resequencing section (RS) of a telecommunication network through which cells of communications are transmitted, said resequencing section having at least one input (S1l/S1n/S1N) and at least one output (S2l/S2m/S2M) and including at least one cell switching network (SN2) having at least one inlet (I2l/I2n/I2N) coupled to said input and at least one outlet (N2l/N2m/N2M), the cells transmitted from said input to said outlet being subjected to a first variable time delay and said cell resequencing system (C1l/C1n/C1N, CK1; R2l/R2m/R2M, CK2) including latching means (R2l/R2m/R2M) coupled between said outlet and said output so as to subject said cells to a second variable time delay which is so chosen that for each cell the sum of said first and second variable time delay is substantially equal to a predetermined constant time value, said predetermined constant time value determining the size of said latching means,

characterized in that said resequencing section (RS) has at least two of said inputs (S1l/S1n/S1N) each coupled to a distinct inlet (I2l/I2n/I2N) via a distinct transmission link (TLl/TLn/TLN), said inputs and said transmission links being arranged in a link group (LG),

that said cells are supplied at any one of said inputs of said link group and are subjected to at least a fixed transfer delay (TD) during their transfer from said input to said outlet (N2l/N2m/N2M), said fixed transfer delay forming part of said first variable time delay, and that the minimum size of said latching means (R2l/R2m/R2M is determined by the difference between said predetermined constant time value and said fixed transfer delay (TD).

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## 5,491,729

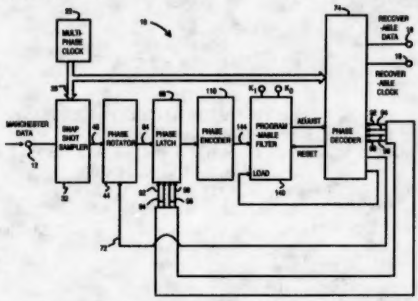
## DIGITAL PHASE-LOCKED DATA RECOVERY CIRCUIT

**Ramon S. Co, Milpitas, and Ron Kao, San Jose, both of Calif., assignors to 3Com Corporation, Santa Clara, Calif.**

**Continuation of Ser. No. 909,569, Jul. 6, 1992, abandoned. This application Nov. 14, 1994, Ser. No. 337,965**

**Int. Cl.[6] H03D** *3/24*

**U.S. Cl. 375—376** **13 Claims**




1. A digital phase-locked data recovery circuit comprising:

means for receiving a data signal;

multi-phase clock means for supplying clock signals having a predetermined relative phase relationship, said multi-phase clock means including a plurality of circuit nodes for providing a set of said clock signals at a first frequency and equally phase-offset from each other;

snap shot sampling means for taking samples of said received data signal in response to said clock signals, said samples being taken within a boundary window centered approximately about a midbit transition of said data signal;

means for comparing said samples with a sample pattern, said comparing means including phase encoder means for generating a plurality of error signals in response to said comparison; and

said comparing means further including filter means for accumulating said plurality of error signals and for generating FORWARD/REVERSE signals when the accumulated plurality of error signals crosses a correction threshold and phase decoder means coupled to said filter means for providing boundary select signals synchronized in phase with said clock signals, said boundary select signals being adjusted by said phase decoder means in accordance with said FORWARD/REVERSE signals.

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## 5,491,730

## COOLING SYSTEM FOR PRIMARY CONTAINMENT VESSEL IN NUCLEAR POWER PLANT AND COMPONENT FOR USE IN SAID COOLING SYSTEM

**Yoshiyuki Kataoka, Ibaraki; Michio Murase, Mito; Hidefumi Araki, and Yasutaka Iwata, both of Hitachi, all of, Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed Jan. 5, 1994, Ser. No. 177,723**

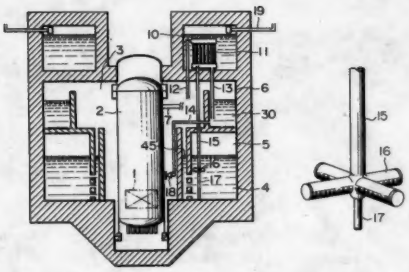
**Claims priority, application Japan, Mar. 11, 1993, 5-050375**

**Int. Cl.[6] G21C** *9/004*

**U.S. Cl. 376—283** **3 Claims**

1. In a cooling water system for a primary containment vessel in a nuclear power plant which system includes a gas vent which extends from a heat exchanger of a condenser-type heat removal system into a suppression pool to be communicated with the water in the suppression pool;

the improvement wherein means for restraining upward movement of a vent fluid is provided on a portion of said gas vent disposed in the suppression pool to extend horizontally to an extent greater than a flow area of said gas vent, said restraining means including communication holes communicated with the water of the suppression pool and disposed below a level where a maximum gas-to-liquid contact area is formed,



and said communication holes being distributed over a range larger than the flow area of said gas vent, and in which said restraining means comprises horizontal pipes connected to and communicated with said gas vent in a plurality of directions, each of said pipes having a closed distal end, and each of said pipes having openings which are in free communication with the water of the suppression pool and are disposed only below a horizontal plane in which axes of said pipes lie.

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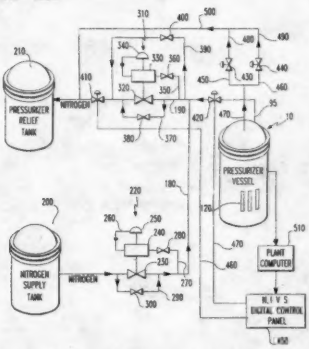
**5,491,731**

## METHOD AND SYSTEM FOR MAINTAINING PRESSURE IN A NUCLEAR POWER PLANT PRIMARY LOOP DURING STARTUP OR SHUTDOWN

**Gary J. Corpora, Monroeville; Thomas G. Bengel, Plum Borough, and Elwyn L. Cranford, III, Greensburg, all of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.**

**Filed Jul. 5, 1994, Ser. No. 270,273**
**Int. Cl.[6] G21C** *7/00*
**U.S. Cl. 376—307** **7 Claims**




1. An automated method for maintaining pressure within a nuclear power plant primary loop, the method comprising the steps of:

partially filling a portion of a pressurizer vessel, in fluid communication with the primary loop, with a liquid for maintaining pressure in the primary loop;

circulating a primary coolant through the primary loop with a reactor coolant pump while controlling the pressure in the pressurizer vessel bye:

(i) automatically injecting an inert gas by a first automated device, operatively connected to the pressurizer vessel, into the pressurizer vessel when the pressure in the pressurizer vessel is less than a first predetermined pressure; and

(ii) automatically venting the gas by a second automated device, operatively connected to the pressurizer vessel, from the pressurizer vessel when the pressure in the pressurizer vessel is greater than a second predetermined pressure; and

circulating the primary coolant through the primary loop with a reactor coolant pump after:

(i) sensing the pressure and the temperature in the pressurizer vessel; and

(ii) isolating the first automated device and the second automated device from the pressurizer vessel when the sensed temperature and pressure in the pressurizer vessel is suitable for operating the primary loop with the automated devices offline.

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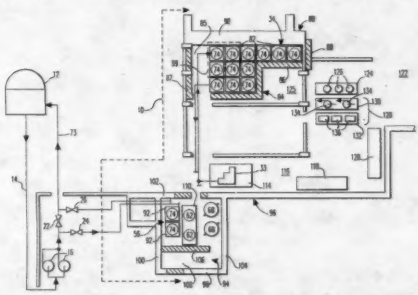
**5,491,732**

## NUCLEAR REACTOR PRIMARY SYSTEM CHEMICAL DECONTAMINATION CLEAN-UP SYSTEM COMPONENT ARRANGEMENT

**Gary J. Corpora, Monroeville; Phillip E. Miller, Greensburg; Thomas G. Bengel, Plum Borough; Frank I. Bauer, Perry Township, Lawrence County; Dan H. Dixon, N. Huntingdon, and James Sejvar, Murrysville, all of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.**

**Filed Dec. 11, 1992, Ser. No. 989,420**
**The portion of the term of this patent subsequent to Jun. 28, 2011, has been disclaimed.**
**Int. Cl.[6] G21C** *19/28*
**U.S. Cl. 376—313** **8 Claims**

1. In a nuclear reactor including a primary system, a fuel storage



building, a primary auxiliary building and a chemical decontamination clean-up system including a chemical injection system for use in cleaning primary system fluids flowing through the nuclear reactor primary system, a layout plan for locating various components of said chemical decontamination cleanup system in said nuclear reactor, comprising the steps of:

a) locating a plurality of first demineralizer banks formed from three banks of cation demineralizers connected in parallel flow relationship and a single bank of anion demineralizers connected in series flow relationship with said three banks of cation demineralizers in a shielded room within said fuel storage building and flow coupling said plurality of first demineralizer banks to said nuclear reactor primary system for receiving said primary system fluids from said primary system;

b) locating a second demineralizer bank in a shielded room within said primary auxiliary building and flow coupling said second demineralizer bank to said plurality of first demineralizer banks for receiving said primary system fluids from said plurality of first demineralizer banks; and

c) locating a return means in said primary auxiliary building and flow coupling said return means to said second demineralizer bank for directing said primary system fluids from said second demineralizer bank to said nuclear reactor primary system.

**5,491,733**

## NUCLEAR FUEL ROD ASSEMBLY APPARATUS

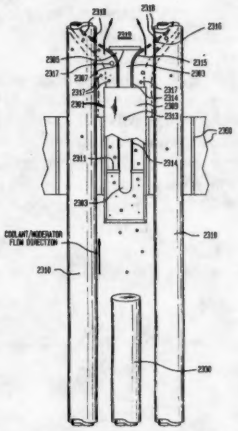
**John F. Patterson; George C. Cooke; Jack Yates, and Trond A. Bjornard, all of Richland, Wash., assignors to Siemens Power Corporation, Richland, Wash.**

**Continuation-in-part of Ser. No. 995,640, Dec. 17, 1992, Pat. No. 5,384,815, and a continuation-in-part of Ser. No. 995,633, Dec. 17, 1992, Pat. No. 5,375,153, which is a continuation-in-part of Ser. No. 850,532, Mar. 13, 1992, Pat. No. 5,345,485, said Ser. No. 995,640is a continuation-in-part of Ser. No. 850,532, Mar. 13, 0. This application May 21, 1993, Ser. No. 65,727**

**The portion of the term of this patent subsequent to Sep. 6, 2011, has been disclaimed.**

**Int. Cl.[6] G21C** *3/322*

**U.S. Cl. 376—443** **7 Claims**




**7**. In a nuclear reactor fuel assembly having plurality of elongated, substantially parallel fuel rods, and a fuel rod spacer, the improvement comprising:

a coolant diverter for diverting at least a portion of liquid coolant in a two phase coolant flow onto adjacent fuel rods, the coolant diverter including a stem portion and a flared diverter portion integrally formed with said stem portion so as to have a smooth, continuous trumpet-like outer surface; the flared diverter portion terminating in a sharp break end portion;

means for mounting said coolant diverter in said fuel rod spacer between adjacent fuel rods, wherein said mounting means includes a diverter tube for mounting said coolant diverter and for guiding the two phase coolant flow along said coolant diverter; said stem portion being fixedly arranged within said diverter tube.

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**5,491,734**

## OFF-AXIS SCANNING ELECTRON BEAM COMPUTED TOMOGRAPHY SYSTEM

**Douglas P. Boyd, Hillsborough, and Roy E. Rand, Palo Alto, both of Calif., assignors to Imatron, Inc., South San Francisco, Calif.**

**Filed Dec. 14, 1993, Ser. No. 167,419**

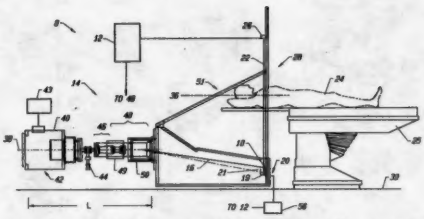
**Int. Cl.[6] H05G** *1/60*

**U.S. Cl. 378—10** **9 Claims**

**1**. An off-axis scanning electron beam computed tomography scanner system having a scanner axis of symmetry, comprising:

an evacuated housing chamber having a first, drift tube, region wherein an electron beam is produced and directed downstream toward a second region that includes a gantry;

an X-ray producing scan target, disposed within said gantry, that emits a fan beam of X-rays upon impingement by said electron beam, said electron beam being substantially perpendicular to a plane defined by said scan target, and said scan target being concentric with and defining a plane normal to said axis of symmetry;




means, disposed intermediate said first and second regions, for focusing and directing said electron beam upon said scan target in a chosen scan path, said electron beam defining a beam spot along said scan path; and

detector means for measuring intensity of said fan beam of X-rays after passage at least partially through an object in said gantry intermediate said scan target and said detector means, and for providing data proportional thereto for use in computer reconstruction of an image of a portion of said object, said detector means being concentric with and defining a plane normal to said axis of symmetry;

wherein said electron beam is produced along a beam source axis that is offset relative to said axis of symmetry.

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**5,491,735**

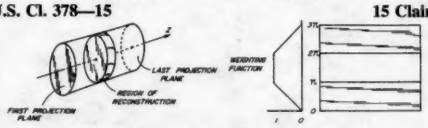
## IMAGE RECONSTRUCTION APPARATUS AND METHOD FOR HELICAL SCANNING

**Jiang Hsieh, Waukesha, Wis., assignor to General Electric Company, Milwaukee, Wis.**

**Filed Dec. 22, 1994, Ser. No. 361,984**

**Int. Cl.[6] A61B** *6/03*; **G01N** *23/083*

**U.S. Cl. 378—15** **15 Claims**




**1**. A method of producing a tomographic image of an image object from data acquired in a helical scan, the data having been collected in a series of fan beam projections at a plurality of gantry angles about an axis and within an image plane, said method comprising the steps of:

(a) creating a projection data array using the data collected in the helical scan;

(b) creating a weighted data array by assigning weights to each data element in the projection data array, the weights being assigned by:

(i) establishing a region of reconstruction;

(ii) assigning each data element within the region of reconstruction a weight of one; and

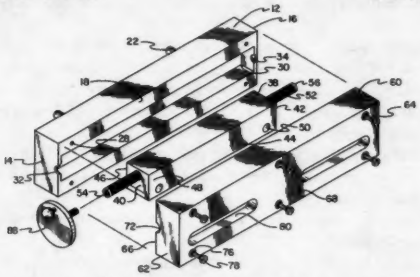
(iii) as the projection plane moves away from the region of reconstruction, assigning a lesser weight to each data element.

5,491,736

## HEAD POSITIONER FOR CAT SCANS

Glenn R. Shudy, W249 S7420 Center Dr., Waukasha, Wis. 53186

Filed Jan. 19, 1995, Ser. No. 374,968
Int. Cl.[6] A47B 71/00; H05G 1/00
U.S. Cl. 378—20 3 Claims



1. A head positioner for CAT scans for moving a patient's head left or right in order to place the head in the proper position for an x-ray comprising, in combination:

a first receptacle having a first end, a second end, an inner surface, and an outer surface, the outer surface having two dowel pins extending outwardly therefrom, the two dowel pins securing the first receptacle to holes on an end of a table cradle, the inner surface having a plurality of apertures formed therein, the inner surface having a slot formed therein, the slot extending from the first end to the second end, the first end having a half moon-shaped opening corresponding with the slot, the second end having a half moon-shaped retaining slot formed therein corresponding with the slot;

a slider having a first end, a second end, an intermediate extent therebetween, a first wall, and a second wall, a threaded aperture formed through the first end and extending through the second end, the second wall having apertures formed therein inwardly of the first end and inwardly of the second end, the slider having a threaded rod, the threaded rod having an open first end and second end, the threaded rod secured within the threaded aperture formed through the first end and extending through the second end, the open first end of the threaded rod extending outwardly of the first end of the slider and the second end of the threaded rod extending outwardly of the second end of the slider, the first wall of the slider secured within the slot of the first receptacle with the open first end of the rod cooperating with the half moon-shaped opening in the first end of the first receptacle and the second end of the rod cooperating with the half moon-shaped retaining slot in the second end of the first receptacle;

a second receptacle having a first end, a second end, an inner surface, and an outer surface, the inner surface having a slot formed therein, the slot extending from the first end to the second end, the first end having a half moon-shaped opening corresponding with the slot, the second end having a half moon-shaped retaining slot formed therein corresponding with the slot, the slot receiving the second wall of the slider therein with the open first end of the rod cooperating with the half moon-shaped opening in the first end and the second end of the rod cooperating with the half moon-shaped retaining slot in the second end, the second receptacle having a plurality of apertures formed therethrough, the plurality of apertures aligning with the plurality of apertures in the inner surface of the first receptacle for securement thereto by screws, the outer surface having a pair of slots formed therethrough extending within the slot in the inner surface, the pair of slots aligning with the pair of apertures formed in the second wall, the pair of slots allowing a pair of dowel pins of a head holder to couple with the pair of apertures in the second wall of the slider;

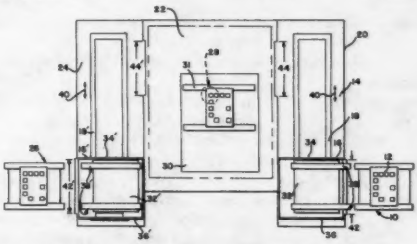
a crank securable to the open first end of the threaded rod of the slider.

5,491,737

## MATERIAL HANDLING AND INSPECTION APPARATUS AND METHOD

Ransom A. Yarnall, La Mesa; J. Paul Axford, and Dale D. Thayer, both of San Diego, all of Calif., assignors to ThermoSpectra Corporation, Franklin, Mass.

Filed Aug. 31, 1994, Ser. No. 299,928
Int. Cl.[6] G01N 23/02; G01B 15/06
U.S. Cl. 378—58 10 Claims



1. A material handling system for transporting a device to or from a radiation chamber in which the device is inspected, comprising:

a shuttle carriage having a base and two opposing walls;

a conveyor mounted between the two opposing walls of the shuttle carriage;

means for moving the shuttle carriage along a path between a loading position and an unloading position; and

a housing that encloses the shuttle carriage and the moving means, wherein the housing has an internal cavity that is fitted around the two opposing walls, and wherein the housing has a first opening coincident with the loading position and a second opening coincident with the unloading position.

7. A method of inspecting a series of devices, comprising the steps of:

conveying a first device with a first conveyor to an input shuttle assembly positioned adjacent to the first conveyor,

shuttling the first device with the input shuttle assembly through a housing to an inspection apparatus;

loading the first device from the input shuttle assembly to the inspection apparatus;

simultaneously inspecting the first device and returning the input shuttle assembly to the position adjacent to the first conveyor;

conveying a second device with the first conveyor to the input shuttle assembly;

shuttling the second device with the input shuttle assembly to the inspection apparatus;

unloading the first device from the inspection apparatus to an output shuttle assembly;

loading the second device from the input shuttle assembly to the inspection apparatus;

simultaneously inspecting the second device and returning the input shuttle assembly to the position adjacent to the first conveyor; and

shuttling the first device with the output shuttle assembly to a second conveyor.

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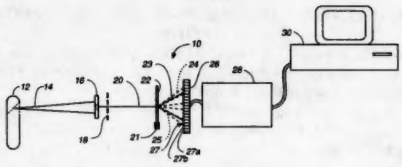
5,491,738

## X-RAY DIFFRACTION APPARATUS

David F. Blake, Redwood City; Charles Bryson, Santa Clara, and Friedemann Freund, San Francisco, all of Calif., assignors to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed Mar. 15, 1993, Ser. No. 33,306
Int. Cl.[6] G01N 23/20
U.S. Cl. 378—71 6 Claims

1. X-ray diffraction apparatus for use in analysing the x-ray diffraction pattern of a sample, consisting essentially of,



a beam source for generating a collimated x-ray beam having one or more discrete x-ray energies,

a holder for holding the sample to be analysed in the path of said beam,

a charge-coupled device having a 2-dimensional array of pixels for detecting, in one or more selected photon energy ranges, x-ray diffraction photons produced by irradiating such a sample with said beam, and

means coupled to said charge-coupled device for receiving input information relating to the energies of photons striking each pixel in said device, for use in reporting the diffraction pattern of photons within a selected energy range striking said device.

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**5,491,739**

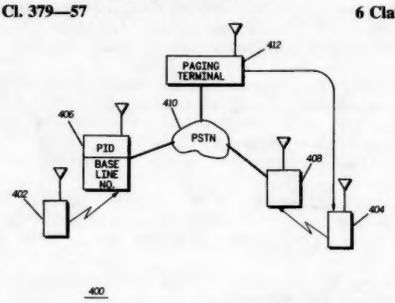
**METHODS OF ESTABLISHING A TWO-WAY CALL IN A RADIO COMMUNICATION SYSTEM**

**Craig P. Wadin, Sunrise, and Paul D. Marko, Ft. Lauderdale, both of Fla., assignors to Motorola, Inc., Schaumburg, Ill.**

**Filed Mar. 4, 1994, Ser. No. 205,455**

**Int. Cl.[6] H04M** *11/00*

**U.S. Cl. 379—57** **6 Claims**




1. A method of establishing a two-way call between a caller using a first cordless handset having an identification number and a second party having access to means for making telephone calls and a pager with a corresponding pager number, the two-way call being established over a system including a first base station with a two-way call feature and capable of wireless communication with the first cordless handset, a public switched telephone network coupled to the first base station through a plurality of lines, and a paging terminal coupled with the public switched telephone network and capable of paging the second party through the pager, the method comprising the steps of:

storing, in the first base station, a telephone number for each line;

establishing, by the caller using the first cordless handset, a first communication link between the first cordless handset and the first base station;

initiating, by the caller using the first cordless handset after establishing the first communication link, a paging service call with the paging terminal wherein a second communication link is established between the first base station and the paging terminal through the public switched telephone network, and wherein a line of the plurality of lines is used in establishing the second communication link;

entering, by the caller using the first cordless handset, a sequence which enables the two-way call feature;

assigning, by the first base station, an alias code representing the identification number of the first cordless handset;

sending, by the first base station to the paging terminal through the public switched telephone network in response to entering the sequence, data representing the telephone number of the line and the alias code;

terminating by the first base station, the first communication link;

transmitting, by the paging terminal after sending the data, to the second party a page including the data and the alias code; and

initiating, by the second party after receiving the data and the alias code, a return call to the telephone number of the line by using the data;

establishing, through the public switched telephone network, a connection between the second party and the line of the first base station;

requesting of the second party, by the first base station, the alias code; and

entering by the second party in response to the requesting the alias code, the alias code, and establishing, by the first base station, a connection between the first base station and the first cordless handset using the stored identification number represented by the alias code.

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**5,491,740**

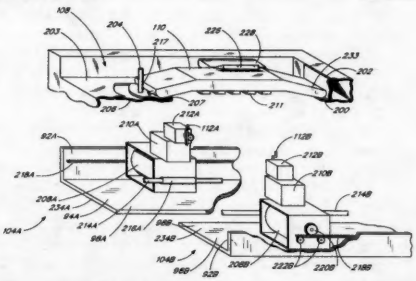
**AUTOMATED KEY ACTUATING CELLULAR TELEPHONE PROGRAMMER**

**Roy D. Ellis, and Steven E. Maurath, both of Santa Ana, Calif., assignors to Activator Systems, Inc., Tustin, Calif.**

**Filed Oct. 27, 1993, Ser. No. 144,184**

**Int. Cl.[6] H04Q** *7/32*

**U.S. Cl. 379—58** **25 Claims**



1. A cellular telephone programmer for actuating keys on a handset of a cellular telephone in a prescribed sequence to prepare the telephone for operation in a cellular system, said programmer comprising:

a memory for retaining programming information related to the model of cellular telephone to be programmed;

a pusher member for mechanically actuating a plurality of keys on the handset of the cellular telephone;

a holder for securing the handset in a position that enables said pusher member to actuate keys on the handset;

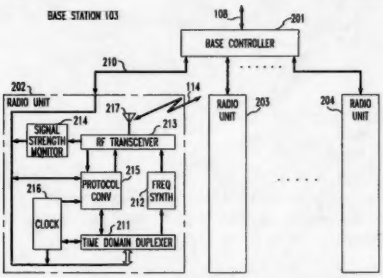
a driver attached to said pusher member; and

a programming module electrically connected to said driver, said module retrieving programming information from said memory and instructing said driver to move said pusher member to press keys on the handset in accordance with the prescribed sequence.

## 5,491,741
## PRIORITIZING A MULTIPLE ACCESS CHANNEL IN A WIRELESS TELEPHONE SYSTEM

**Charles Y. Farwell, Denver; Richard D. Miller, Northglenn, and Richard A. Windhausen, Westminster, all of Colo., assignors to AT&T Corp., Murray Hill, N.J.**

**Filed Oct. 23, 1992, Ser. No. 965,504**
**Int. Cl.[6] H04Q** *7/22*
**U.S. Cl. 379—59** **28 Claims**




1. A wireless base station for operation in a wireless system, the wireless base station being interconnected to a switching system for establishment of communication links and the wireless system including a plurality of wireless mobile units for establishing communication with the wireless base station, the wireless base station comprises:

means for receiving a first service request message from one of the wireless mobile units;

means for transmitting a first base reply message to the one of the wireless mobile units in a predefined time slot of a frame of time slots upon the one of the wireless mobile units being assigned to the wireless base station;

means for determining a time slot on the basis of the received signal strength of the one of wireless mobile units;

the transmitting means further transmitting the first base reply message to the one of wireless mobile units in the determined time slot upon the one of the wireless mobile units not being assigned to the wireless base station;

receiving means further receiving a second service request message from the one of the wireless mobile units indicating a collision during the transmission of the first base reply message;

the determining means further responsive to the indication of a collision for randomly determining a time slot; and

the transmitting means further transmitting a second base reply message in the randomly determined time slot.

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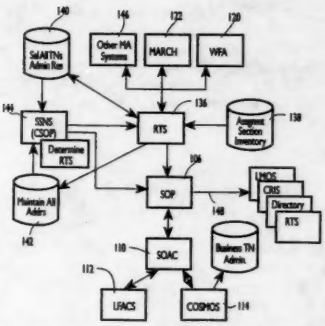
## 5,491,742
## METHOD AND APPARATUS FOR PROVISIONING A PUBLIC SWITCHED TELEPHONE NETWORK

**Myron E. Harper, Burtonsville; Sharon L. Robson, Silver Spring, both of Md., and Connie W. Combs, Leesburg, Va., assignors to Bell Atlantic Network Services, Inc., Arlington, Va.**

**Continuation-in-part of Ser. No. 152,360, Nov. 16, 1993, Pat. No. 5,416,833. This application Jan. 20, 1995, Ser. No. 376,201**
**Int. Cl.[6] H04M** *3/42*
**U.S. Cl. 379—201** **10 Claims**




1. An administration system for a public switched telephone network (PSTN), comprising:

a first automatic service order processing system which receives a service request from a customer requesting service and stores first customer facility data in a first database associated therewith,

when the service request is eligible for processing by said first automatic service order processing system, said first automatic service order processing system automatically provisions first customer facilities to execute the service request based upon the first customer facility data, and the first customer facility data maintained by the first automatic service order processing system without being altered when a disconnect request is received from the customer, and

when the service request is not eligible for processing by said first automatic service order processing system, said first automatic service order processing system generates a provisioning request to process the service request; and

a second automatic service order processing system operatively connected to said first automatic service order processing system and storing second customer facility data in a second database associated therewith, said second automatic service order processing system receiving the provisioning request from said first automatic service order processing system and automatically provisioning second customer facilities to execute the service request, said second automatic service order processing system not being required to reassign the first customer facilities as the second customer facilities when a disconnect request is received from the customer.

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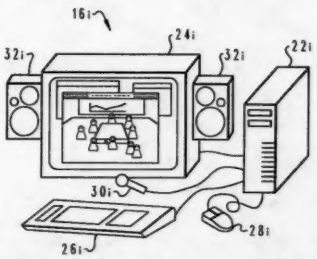
## 5,491,743
## VIRTUAL CONFERENCE SYSTEM AND TERMINAL APPARATUS THEREFOR

**Ichiro Shiio, Yokohama, and Makoto Kobayashi, Kawasaki, both of, Japan, assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed May 24, 1994, Ser. No. 248,117**
**Int. Cl.[6] H04N** *7/12; 11/00*
**U.S. Cl. 379—202** **6 Claims**




2. A terminal apparatus for a virtual conference system, comprising:

a display means for displaying a virtual conference room used for holding a virtual conference, and for displaying, in the virtual conference room, animated characters representing participants at the virtual conference;

an indication means for indicating an action of an animated character representing a particular corresponding participant;

an information output means for outputting action information for the animated character representing a particular corresponding participant indicated by the indication means; and

a character control means for actuating the other animated characters in accordance with input action information for the other animated characters, and for actuating the animated character representing the particular corresponding participant in accordance with the indicated action when receiving permission information corresponding to the output action information.

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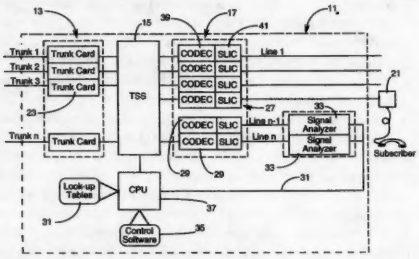
**5,491,744**

## SELECTIVE CALL WAITING

**Dan Kikinis, Saratoga, Calif., assignor to Consilium Overseas Limited, Geneva, Switzerland**

**Filed Jun. 30, 1995, Ser. No. 497,921**
**Int. Cl.[6] H04M** *3/42*
**U.S. Cl. 379—215** **8 Claims**




1. A method for operating a selective call-waiting service, comprising steps of:

(a) receiving an incoming call and determining its destination;

(b) determining if destination line is in use;

(c) if destination line is not in use, routing the incoming call on the destination line;

(d) if destination line is in use, checking subscription information to determine if a subscriber on the destination line has selective call-waiting service;

(e) if the subscriber on the destination line has the selective call-waiting service, checking destination line for voice-type or data-type transmission;

(f) if data-type transmission, sending a busy signal to the incoming caller, and no call-waiting signal to the destination line;

(g) if voice-type transmission, sending a call-waiting signal to the destination line.

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**5,491,745**

## METHOD AND APPARATUS FOR A DUAL MODE KEYPAD PERMITTING ONE-TOUCH TELEPHONE NUMBER DIALING

**G. R. Konrad Roeder, North Richland Hills, Tex., assignor to Uniden America Corporation, Fort Worth, Tex.**

**Filed Feb. 20, 1991, Ser. No. 658,966**
**Int. Cl.[6] H04M** *1/27*
**U.S. Cl. 379—355** **3 Claims**

1. A one-touch telephone number dialing system, comprising:

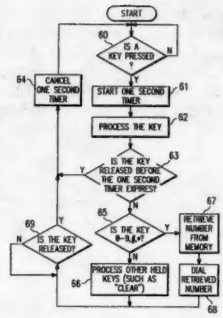
a keypad comprising a plurality of numeric keys and special function keys for inputting data corresponding to a selected key;

a memory having a plurality of memory locations for storing at least one sequence of data, each location corresponding to one of the keypad keys;

a buffer for receiving data from the keypad and for receiving a sequence of data from the memory;

a dialer for transmitting dial signals from the system; and

a controller for entering into the buffer data from the keypad upon actuation of a corresponding keypad key, and, if the corresponding keypad key is held down for more than a predetermined time period, for clearing the buffer, retrieving a


START
IS A KEY PRESSED ?
CANCEL ONE SECOND TIMER
START ONE SECOND TIMER
PROCESS THE KEY
IS THE KEY RELEASED BEFORE THE ONE SECOND TIMER EXPIRES?
IS THE KEY RELEASED?
IS THE KEY 0-9,#,*?
RETRIEVE NUMBER FROM MEMORY
PROCESS OTHER HELD KEYS (SUCH AS "CLEAR")
DIAL RETRIEVED NUMBER

sequence of data from one of said memory locations corresponding to the actuated keypad key, entering the retrieved sequence of data into the buffer, and enabling the dialer to dial the retrieved sequence of data.

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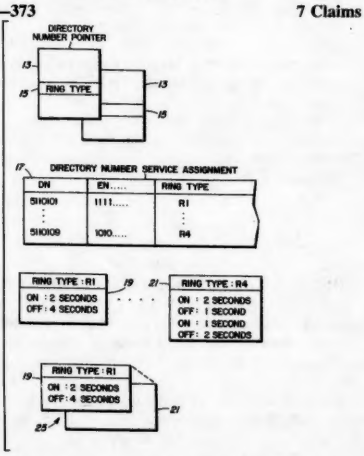
**5,491,746**

## UNIQUE RINGING ON A PRIME TELEPHONE

**Deborah L. Pinard, Kanata, Canada, assignor to Mitel Corporation, Canada**

**Filed Mar. 8, 1994, Ser. No. 207,958**
**Claims priority, application Canada, Mar. 9, 1993, 2091278**
**Int. Cl.[6] H04M** *13/00*
**U.S. Cl. 379—373** **7 Claims**




1. A method of ringing a telephone line comprising:

(a) receiving a request for service to a first telephone line, the request being identified by a first directory number,

(b) looking up in a table containing a plurality of ringing sequences, a first particular ringing sequence which is allocated to the first directory number, and

(c) applying the first particular ringing sequence to a subscriber's line which terminates at the first telephone, and ringing the first telephone in the first particular ringing sequence.

**5,491,747**

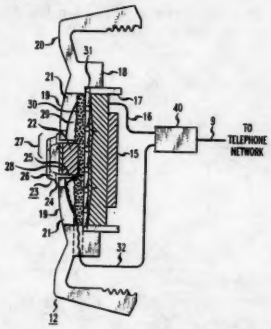
## NOISE-CANCELLING TELEPHONE HANDSET

**Charles S. Bartlett, Clinton, Md.; Roger D. Benning, Long Valley, N.J.; John B. Hunter, Basking Ridge, N.J.; Charles Sanford, Somerset, N.J., and Michael A. Zuniga, Fairfax, Va., assignors to AT&T Bell Corp., Coral Gables, Fla.**

**Continuation of Ser. No. 954,175, Sep. 30, 1992, abandoned. This application Jul. 25, 1994, Ser. No. 279,389**

**Int. Cl.[6] H04M** *1/00*

**U.S. Cl. 379—433** **6 Claims**




1. An ambient noise-reducing telephone handset comprising:

a) a transmitter end and a transmitter cap (**11**) disposed on said end;

b) a receiver end, a receiver cap (**12**) disposed on said receiver end, and a receiver (**15**) mounted in said receiver cap; and

c) a noise-cancellation microphone (**22**), a noise-cancellation control circuit (**40**), and electrically conductive means (**32**) connecting said microphone to said circuit; wherein:

d) the receiver cap comprises an earpiece (**19**) formed around a central aperture;

e) the handset further comprises a housing (**23**) mounted through the central aperture, the housing comprising an outwardly protruding extension (**27**) adapted to fit within a user's outer ear cavity;

f) the noise-cancellation microphone is situated within said extension such that in use, said microphone directly samples ambient noise within the user's outer ear cavity;

g) defined within the earpiece is a plurality of radial slots (**21**) that surrounds the central aperture and constitutes an acoustic grill through which signals from the receiver can pass directly to the user's ear canal; and

h) defined within the extension, adjacent the plurality of radial slots, is a plurality of substantially radially-extending sound ports (**26**) for effecting an acoustic path from the receiver to the noise-cancellation microphone.

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**5,491,748**

## ENHANCED SECURITY FOR A CABLE SYSTEM

**Frederick H. Auld, Jr., Barrington, and Michael E. Long, Oakbrook, both of Ill., assignors to Zenith Electronics Corporation, Glenview, Ill.**

**Filed Mar. 1, 1994, Ser. No. 203,955**

**Int. Cl.[6] H04N** *7/167*

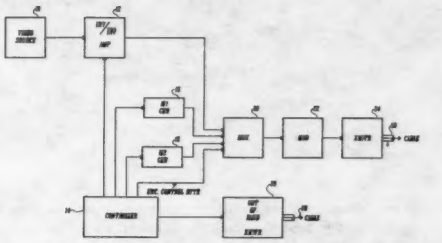
**U.S. Cl. 380—15** **8 Claims**

1. A method of operating a cable television plant including a cable head-end and a plurality of subscriber terminals, each of said subscriber terminals having single mode signal descrambling means that is either ON or OFF and microprocessor control means comprising:

transmitting a scrambled television signal including a first and a second mode signal therein to said subscriber terminals;

transmitting an encoded mode control signal in said scrambled television signal to said subscriber terminals;

supplying said encoded mode control signal to said microprocessor control means for decoding;



supplying said first and said second mode signals to said signal descrambling means; and

turning said signal descrambling means ON and OFF responsive to said first and said second mode signals as validated by said encoded mode control signal.

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**5,491,749**

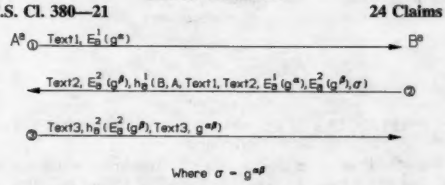
## METHOD AND APPARATUS FOR ENTITY AUTHENTICATION AND KEY DISTRIBUTION SECURE AGAINST OFF-LINE ADVERSARIAL ATTACKS

**Phillip W. Rogaway, Austin, Tex., assignor to International Business Machines Corporation, Armonk, N.Y.**

**Filed Dec. 30, 1993, Ser. No. 175,881**

**Int. Cl.[6] H04L** *9/08*

**U.S. Cl. 380—21** **24 Claims**




1. A method of authenticating a communication partner in an insecure communication channel wherein authenticity of communication partners is determined by possession of a long-lived shared secret key, comprising the method steps of:

(a) exchanging data flows between communication partners, to define a composite key, wherein at least a portion of said data flows has been encrypted or otherwise masked in a manner which utilizes said long-lived shared secret key;

(b) passing at least one authentication tag between said communication partners, wherein said at least one authorization tag is defined by a transform taken over a plurality of parameters and at least partially based on said composite key, said transform including at least one of (i) a message authentication code which is keyed by said long-lived shared secret key; (ii) a cryptographic hash function taken over said long-lived shared secret key; and (iii) a masking operation involving said long-lived shared secret key; and

(c) utilizing said authentication tag to determine authenticity of at least one communication partner.

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**5,491,750**

## METHOD AND APPARATUS FOR THREE-PARTY ENTITY AUTHENTICATION AND KEY DISTRIBUTION USING MESSAGE AUTHENTICATION CODES

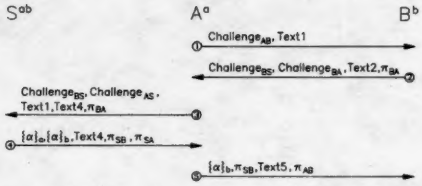
**Mihir M. Bellare, New York, N.Y., and Phillip W. Rogaway, Austin, Tex., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed Dec. 30, 1993, Ser. No. 175,882**

**Int. Cl.[6] H04L** *9/08*

**U.S. Cl. 380—21** **15 Claims**

1. A method of authenticating communication partners utilizing communication flows which are passed over an insecure communication channel, comprising the method steps of:




(a) providing a trusted intermediary which is capable of communication with said communication partners over said insecure communication channel;

(b) providing a plurality of long-lived secret keys, one for each communication partner;

(c) distributing each of said plurality of long-lived secret keys to (1) a particular one of said communication partners, and (2) said trusted intermediary;

(d) receiving at said trusted intermediary a request for communication between communication partners;

(e) utilizing said trusted intermediary to generate a short-lived secret key for utilization in a communication session between said communication partners;

(f) masking said short-lived secret key for each particular communication partner in a manner that is dependent upon that particular partner's long-lived secret key;

(g) distributing said masked short-lived secret keys in a plurality of communication flows to said communication partners;

(h) exchanging authentication tags among said communication partners and said trusted intermediary.

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**5,491,751**

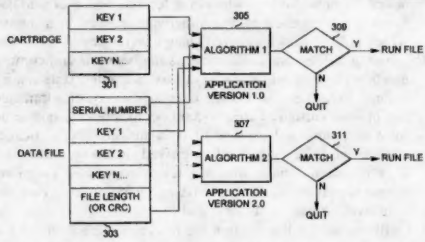
## INTELLIGENT ACCOMPANIMENT APPARATUS AND METHOD

**John W. Paulson, Edina; Stephen P. Weisbrod, Minnetonka, and Mark E. Dunn, Apple Valley, all of Minn., assignors to Coda Music Technology, Inc., Minn.**

**Division of Ser. No. 65,831, May 21, 1993. This application Jun. 5, 1995, Ser. No. 461,429**

**Int. Cl.[6] H04L** *9/00*

**U.S. Cl. 380—25** **2 Claims**




1. A method for preventing the unauthorized use of a repertoire data file with a digital computer and a data cartridge, the repertoire data file having a serial number, file length value, and a predetermined series of target data keys each generated by one of a series of different encryption algorithms, the method comprising the steps of:

(a) extracting the serial number and the file length value from the repertoire data file;

(b) selecting an encryption data key from a predetermined series of data keys contained in the data cartridge;

(c) using one of the series of different encryption algorithms and the selected encryption data key to encrypt the serial number and file length value to generate a resultant data key;

(d) comparing the resultant data key to one of the series of target data keys; and

(e) allowing access to the repertoire data file if the resultant data key matches one of the series of target data keys.

**5,491,752**

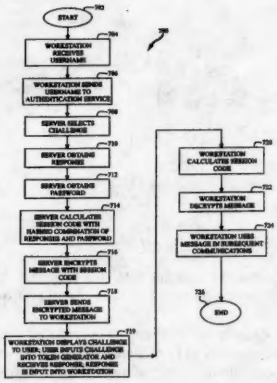
## SYSTEM FOR INCREASING THE DIFFICULTY OF PASSWORD GUESSING ATTACKS IN A DISTRIBUTED AUTHENTICATION SCHEME EMPLOYING AUTHENTICATION TOKENS

**Charles W. Kaufman, Northborough; Radia J. Pearlman, Acton, and Morrie Gasser, Hopkinton, all of Mass., assignors to Digital Equipment Corporation, Patent Law Group, Maynard, Mass.**

**Continuation of Ser. No. 34,225, Mar. 18, 1993, abandoned. This application Sep. 2, 1994, Ser. No. 300,576**

**Int. Cl.[6] H04K** *1/00*

**U.S. Cl. 380—30** **37 Claims**


START
WORKSTATION RECEIVES USERNAME
WORKSTATION SENDS USERNAME TO AUTHENTICATION SERVICE
SERVER SELECTS CHALLENGE
SERVER OBTAINS RESPONSE
SERVER OBTAINS PASSWORD
SERVER CALCULATES SESSION CODE WITH HASHING COMBINATION OF RESPONSES AND PASSWORD
SERVER ENCRYPTS MESSAGE WITH SESSION CODE
SERVER SENDS ENCRYPTED MESSAGE TO WORKSTATION
WORKSTATION DISPLAYS CHALLENGE TO USER; USER INPUTS CHALLENGE INTO TOKEN GENERATOR AND RECEIVES RESPONSE; RESPONSE IS INPUT INTO WORKSTATION
WORKSTATION CALCULATES SESSION CODE
WORKSTATION DECRYPTS MESSAGE
WORKSTATION USES MESSAGE IN SUBSEQUENT COMMUNICATIONS
END

1. A method for securely accessing a computing system, comprising the steps of:

(a) a workstation receiving a token from a first passive authentication token generator and receiving a secret password associated with a user;

(b) the workstation generating a transmission code by performing a first hashing algorithm upon data comprising:

(1) the token and

(2) the secret password;

(c) the workstation sending the transmission code to an authentication server;

(d) the server receiving and verifying the validity of the transmission code;

(e) if the transmission code is valid, the server transmitting to the workstation a message encrypted with a session code generated by performing a second hashing algorithm upon data comprising the token and the password, the second hashing algorithm being substantially different than the first hashing algorithm;

(f) the workstation receiving the message;

(g) the workstation computing the session code by performing the second hashing algorithm on the password and the token; and

(h) the workstation using the session code to decrypt the message.

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**5,491,753**

## METHOD AND DEVICE FOR TESTING FOR AUDIO INDUCED SYMPATHETIC BUZZES

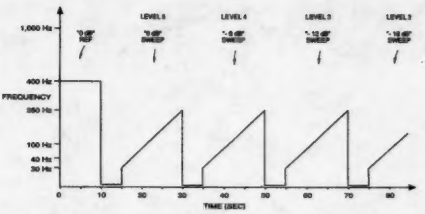
**James E. Van Hout, Auburn Hills; David J. Madaj, Ann Arbor; Roland Holloman, Southfield, and Philip A. Kuyava, Troy, all of Mich., assignors to Chrysler Corporation, Highland Park, Mich.**

**Filed Nov. 22, 1993, Ser. No. 156,136**

**Int. Cl.[6] H04R** *29/00*

**U.S. Cl. 381—58** **9 Claims**

1. A device for testing to eliminate loud speaker induced forced sympathetic audible vibrations within a predetermined listening environment comprising:




audio means for responding to an audio means player to produce a pre-recorded signals, said signals including a first audio signal recorded at about 0 dB sweeping from about 30 Hz to about 250 Hz in a time period of about 20 seconds;

a second audio signal recorded at about −6 dB sweeping from about 30 Hz to about 250 Hz in a time period of about 20 seconds;

a third audio signal recorded at about −12 dB sweeping from about 30 Hz to about 250 Hz in a time period of about 20 seconds;

a fourth audio signal recorded at about −18 dB sweeping from about 30 Hz to about 250 Hz in a time period of about 20 seconds; and

a fifth audio signal recorded at about −24 dB sweeping from about 30 Hz to about 250 Hz in a time period of about 20 seconds.

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**5,491,754**

## METHOD AND SYSTEM FOR ARTIFICIAL SPATIALISATION OF DIGITAL AUDIO SIGNALS

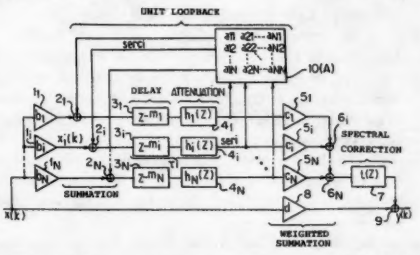
**Jean-Marc Jot, Paris, and Antoine Chaigne, Buc, both of, France, assignors to France Telecom, Paris, France**

**Filed Feb. 19, 1993, Ser. No. 19,846**

**Claims priority, application France, Mar. 3, 1992, 92 02528**

**Int. Cl.[6] H03G** *3/00*

**U.S. Cl. 381—63** **14 Claims**




1. System for processing of a digital audio signal x(k) for creating a spatially processed digital audio signal y(k) comprising:

means for delaying a plurality of elementary signals xi(k) of said digital audio signal x(k) with different delay and for delivering a plurality of delayed elementary signals;

means for linearly combining said delayed elementary signals and for delivering a plurality of combined delayed elementary signals;

means for adding a combined delayed elementary signal with one of said elementary signals xi(k), prior to delaying the latter;

means for weighted summation of said delayed elementary signals and said digital audio signal x(k) in order to create said spatially processed audio-digital signal y(k), wherein said linearly combining means and said adding means constitutes a unitary feedback loop, for which said plurality of combined delayed elementary signals possess the same energy as said delayed elementary signals, said system further including, means for attenuating each delayed elementary signal, as an attenuation Hi(ω) function of the audio frequency (ω), said attenuation, expressed in decibels, being proportional to each delay and inversely proportional to reverberation time Tr(ω); and

means for spectral correction t(z) of said weighted sum of said attenuated delayed elementary signals, prior to their weighted summation with the audio-digital signal x(k), said spectral correction satisfying the relation:

$$|t(e^{j\omega})|^2 = \frac{\Sigma \tau i}{Tr(\omega)}$$

where τi, defined as the absorbent delay, designates the value of each delay, Στi designates the sum of all the absorbent delays, said system constituting a reverberant filter.

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**5,491,755**

## CIRCUIT FOR DIGITAL PROCESSING OF AUDIO SIGNALS

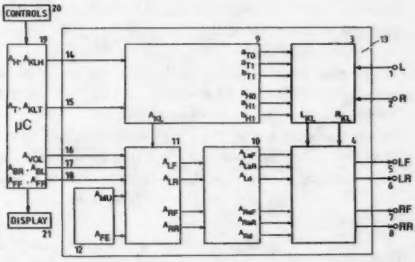
**Lothar Vogt, Hohenhameln, and Matthias Herrmann, Hildesheim, both of, Germany, assignors to Blaupunkt-Werke GmbH, Hildesheim, Germany**

**Filed Jan. 18, 1994, Ser. No. 183,029**

**Claims priority, application Germany, Feb. 5, 1993, 43 03 386.5**

**Int. Cl.[6] H04B** *1/00*

**U.S. Cl. 381—86** **7 Claims**




1. A circuit for digital processing of audio signals in a vehicle radio receiver, comprising:

a digital filter serving as a tone control of the radio receiver, said digital filter having a frequency response which is controllable responsive to supplied coefficients; and

a volume control for controlling a volume of the radio receiver responsive to control signals;

said digital filter having controllable low frequency, high frequency and medium frequency transfer profiles, said transfer profiles being controlled responsive to respective control signals such that when at least one of said high and low frequency transfer profiles of said digital filter is increased relative to said medium frequency transfer profile, said medium frequency transfer profile of said digital filter is decreased; and

a control signal corresponding to the decrease of the medium frequency transfer profile of said digital filter being supplied to said volume control to cause said volume control to compensate a volume of the vehicle radio receiver based on the decrease of the medium frequency profile of the digital filter;

whereby the decrease in the medium control frequency transfer profile of said digital filter normalizes a transmission factor for the at least one of the high and low frequency transfer profiles that was increased.

## 5,491,756

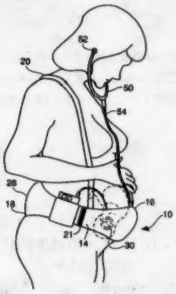
## SYSTEM FOR DELIVERING SOUND TO AND MONITORING EFFECTS ON A FETUS

**Caramia Francais, 425 S. Catalina Ave. No. 6, Redondo Beach, Calif. 90277**

**Filed Nov. 4, 1993, Ser. No. 143,981**

**Int. Cl.[6] H04R** *1/02*

**U.S. Cl. 381—90** **20 Claims**




1. A system for generating and imparting sound to a fetal child through the mother's abdomen and which allows for monitoring effects on the fetal child, said system comprising:

a) a belt sized for wearing about the waist of a woman user and having a frontal portion which extends over a surface area of the lower abdomen of the woman user;

b) at least one speaker mounted in and carried by said belt and being located in juxtaposition to the abdomen in proximity to that fetal child for imparting sound to the fetal child across the wall of the abdomen;

c) sound generating means carried by said belt and generating sounds of the type to be imparted to said fetal child and having an output connected to said speaker;

d) a stethoscope sensor for generating audible signals mounted in and carried by said belt and also being located in juxtaposition to the abdomen in proximity to the fetal child to enable listening to sounds generated by the fetal child in the abdomen; and

e) a conductor extending from said stethoscope sensor and having a connector for quickly releasably coupling to an earpiece so that a user of the system can monitor the effects of the sound generated by the sound generating means on the fetal child.

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## 5,491,757

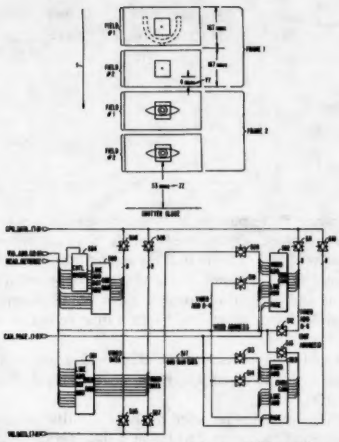
## FIELD TESTER GAZE TRACKING USING CONTENT ADDRESSABLE MEMORIES TO IMPROVE IMAGE DATA ANALYSIS SPEED

**Donald E. Lehmer, Berkeley, and Alan R. Kirschbaum, Oakland, both of Calif., assignors to Humphrey Instruments, Inc., San Leandro, Calif.**

**Filed Dec. 22, 1993, Ser. No. 172,136**

**Int. Cl.[6] A61B** *3/024;* **G06K** *9/78*

**U.S. Cl. 382—128** **13 Claims**



1. A method of processing a video image having first and second fields of image intensity data with known boundaries of high contrast comprising the steps of:

providing first and second read and write memories each addressable by row number and column number addresses for storing image intensity data of the first and second fields of the video image at the row number and column number addresses;

providing first and second content addressable memories addressed by row number address and an address related to image intensity for storing the column number addresses of the first and second fields of the video image at the row address and the address related to image intensity;

initially clearing the first and second content addressable memories;

loading the first read and write memory with row number address and column number address to store image intensity data from the first field of the video image;

loading the first content addressable memory by row number address and an address related to image intensity to store column number address from the first field of the video image;

loading the second read and write memory with row number address and column number address to store video intensity data from the second field of the video image;

loading the second content addressable memory by the row number address and an address related to image intensity to store column number address from the first read and write memory reading the data from the first read and write memory in the reverse address order with respect to the first content addressable memory;

searching the row number addresses sequentially of the first content addressable memory at a predetermined intensity level for a non-cleared content to locate a column number address;

using the column number address contained in the first content addressable memory and the associated row number address to address the first read and write memory at a location near the left edge of a high contrast boundary;

searching the row number addresses sequentially of the second content addressable memory at a predetermined intensity level for a non-cleared content to locate a column number address;

using the column number address contained in the second content addressable memory and the associated row number address to address the second read and write memory at a location near the left edge of a high contrast boundary;

providing a search protocol for searching less than all of the video image in the first and second read and write memories; and,

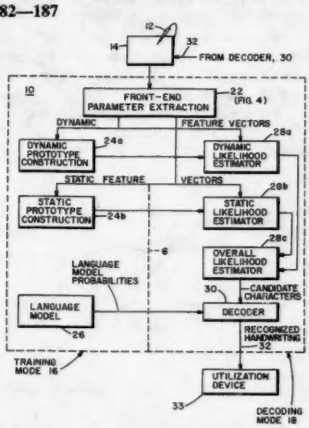
using the search protocol to search the first and second read and write memories utilizing the row and column addresses of the predetermined intensity level whereby less than all of the video image in the first and second read and write memories is searched by the search protocol.

5,491,758

## AUTOMATIC HANDWRITING RECOGNITION USING BOTH STATIC AND DYNAMIC PARAMETERS

**Jerome R. Bellegarda, Goldens Bridge; David Nahamoo, White Plains, and Krishna S. Nathan, New York, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed Jan. 27, 1993, Ser. No. 9,515**
**Int. Cl.[6] G06K** *9/00*
**U.S. Cl. 382—187** **5 Claims**




1. Handwriting recognition apparatus, comprising:

handwriting transducer means having an output providing x-y coordinate information generated by a writer;

first means, having an input coupled to said output of said handwriting transducer means, for partitioning the x-y coordinate information into first partitions, and for extracting and outputting temporally-based feature vectors from the first partitions of the x-y coordinate information;

second means, having an input coupled to said output of said handwriting transducer means, for partitioning the x-y coordinate information into second partitions, and for extracting and outputting spatially-based feature vectors from the second partitions of the x-y coordinate information; and

processing means, having a first input coupled to an output of said first means and a second input coupled to an output of said second means, for processing the temporally-based feature vectors that are output from said first extracting means and the spatially-based feature vectors that are output from said second extracting means to determine first probabilities that the temporally-based feature vectors represent predetermined first prototype characters and to determine second probabilities that the spatially-based feature vectors represent predetermined second prototype characters, said processing means further including means for determining, based on a weighted combination of said first probabilities and said second probabilities, a third probability that the x-y coordinate information generated by the writer represents one of a plurality of predetermined characters.

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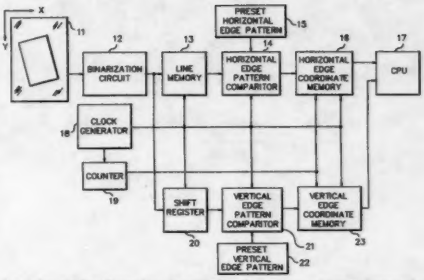
5,491,759

## DOCUMENT EDGE DETECTION APPARATUS

**Kagenori Nagao, Yokohama; Yoshinori Takizawa, Tokyo, and Naoko Matsumoto, Yokohama, all of, Japan, assignors to Eastman Kodak Company, Rochester, N.Y.**

**Continuation of Ser. No. 47,908, Apr. 19, 1993, abandoned.**
**This application Jun. 23, 1994, Ser. No. 264,533**
**Claims priority, application Japan, Nov. 25, 1992, 4-314497**
**Int. Cl.[6] G06K** *9/48*
**U.S. Cl. 382—199** **1 Claim**




1. A document edge detection apparatus comprising:

(a) edge point detection means for detecting at equal intervals in a primary scanning direction and in a secondary scanning direction perpendicular to the primary scanning direction a plurality of binarized points along at least two edges of a rectangular document image in a two-dimensional image space;

(b) direction vector creation means for creating direction vectors by connecting adjacent pairs of the plurality of binarized edge points detected by the edge point detection means;

(c) counting means for counting each of the direction vectors created by said vector direction means and the number of other direction vectors that have a parallel relationship with vectors included along one document edge in the secondary scanning direction and the number of direction vectors having a perpendicular relationship with vectors included along another document edge in the primary scanning direction;

(d) selection means for retaining the points of the direction vectors with the highest count together with vectors parallel thereto in the secondary scanning direction and eliminating points belonging to other direction vectors having a lower count and retaining the points of the direction vectors having a perpendicular relationship with vectors included along another document edge in the primary scanning direction; and

(e) edge calculation means responsive to points retained by the selection means for each of the scanning directions for obtaining an equation of a straight line for each one of the two edges of the rectangular document image that is coincident with its corresponding document edge.

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5,491,760

## METHOD AND APPARATUS FOR SUMMARIZING A DOCUMENT WITHOUT DOCUMENT IMAGE DECODING

**M. Margaret Withgott, Los Altos; Steven C. Bagley; Dan S. Bloomberg, both of Palo Alto; Per-Kristian Halvorsen, Los Altos, all of Calif.; Daniel P. Huttenlocher, Ithaca, N.Y.; Todd A. Cass, Cambridge, Mass.; Ronald M. Kaplan, Palo Alto, and Ramana R. Rao, San Francisco, both of Calif., assignors to Xerox Corporation, Stamford, Conn.**

**Continuation of Ser. No. 794,543, Nov. 19, 1991, abandoned.**
**This application May 9, 1994, Ser. No. 240,284**
**Int. Cl.[6] G06K** *9/46*
**U.S. Cl. 382—203** **20 Claims**

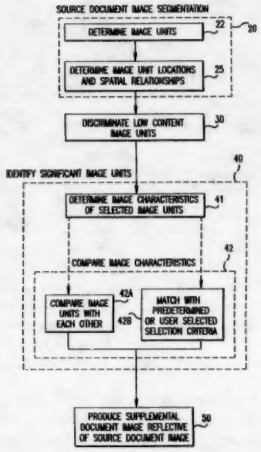
1. A method for electronically processing an electronic document image without first decoding the electronic document image, comprising:

segmenting the document image into word image units without decoding the document image;

deriving a word shape representation for each of a plurality of said word image units without decoding any characters making up the plurality of word image units, thereby deriving a plurality of said word shape representations;

comparing said word shape representations to at least one other word shape representation to identify significant word image units from amongst said plurality of word image units; and

creating an abbreviated document image that is smaller than the electronic document image based on said identified significant




word image units, said abbreviated document image including a plurality of said identified significant word image units.

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**5,491,761**

## QUANTIZATION STEP SIZE ADJUSTING CIRCUIT USING EDGE DETECTIONS

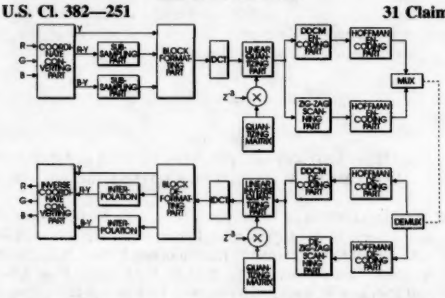
**Tae E. Kim, Seoul, Rep. of Korea, assignor to SamSung Electronics Co., Ltd., Suwon, Rep. of Korea**

**Filed Oct. 15, 1991, Ser. No. 775,551**

**Claims priority, application Rep. of Korea, Jan. 18, 1990, 90-16635**

**Int. Cl.[6] G06K** *9/38*

**U.S. Cl. 382—251** **31 Claims**



1. A quantization step size adjusting circuit using edge detections, comprising:

control means for providing control signals to control and entire system;

coordinate converting means for providing a luminance signal and color difference signals in dependence upon reception of an image signal representative of a red color, a green color and a blue color;

edge detecting means for extracting contour data for each frame of said luminance and color difference signals by detecting edge values corresponding to addresses designated by said control signals in dependence upon reception of said luminance and color difference signals;

frame memory means for storing the extracted contour data according to the addresses designated by said control signals;

block formatting means for summing up edge values in each data block of said luminance and color difference signals after dividing the stored contour data for one frame into a plurality of data blocks; and

scaling factor generating means for generating a plurality of scaling factors in accordance with pixel density representation of an image in response to the summed-up edge values for each data block from said block formatting means.

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**5,491,762**

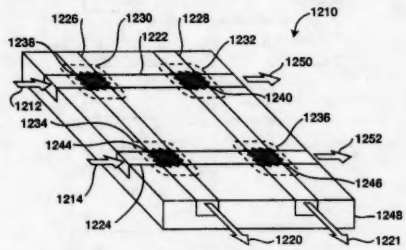
## ATM SWITCH WITH ELECTRICALLY-CONTROLLED WAVEGUIDE-ROUTING

**David A. G. Deacon, Los Altos; William K. Bischel, Menlo Park; Michael J. Brinkman, Redwood City, and Simon J. Field, Menlo Park, all of Calif., assignors to Deacon Research, Palo Alto, Calif.**

**Filed Sep. 9, 1994, Ser. No. 303,845**

**Int. Cl.[6] G02B** *6/36*

**U.S. Cl. 385—16** **14 Claims**




1. A beam routing device operative as a switch for optical beams between an array of positions comprising:

at least a first waveguide segment traversing a solid material along a plane of said solid material;

a plurality of second waveguide segments traversing said solid material along said plane, said second waveguide segments encountering said first waveguide segment adjacent a plurality of intersections; and

electrically controllable optical energy redirector means disposed near said intersection and controlled by at least a first electrode to controllably redirect optical energy between said first waveguide segment and selected said second waveguide segments upon application of an electric field adjacent selected ones of said intersections;

a plurality of electrodes confronting said solid material adjacent said intersections; and

electrical contacts coupled to said electrodes for electrical connection with a potential source for selectively controlling electric fields of said electrically controllable grating means.

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**5,491,763**

## OPTICAL HYBRID WITH 3×3 COUPLING DEVICE

**Mattijs O. van Deventer, Leidschendam, and Johannes J. G. M. van Der Tol, Zoetermeer, both of, Netherlands, assignors to Koninklijke PTT Nederland N.V., AC Groningen, Netherlands**

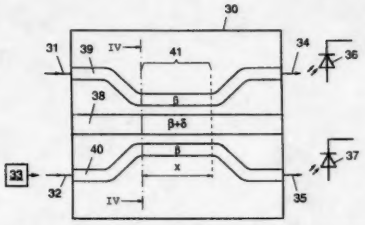
**Continuation-in-part of Ser. No. 39,766, Mar. 30, 1993, abandoned. This application May 13, 1993, Ser. No. 61,302**

**Claims priority, application Netherlands, Apr. 3, 1992, 9200634**

**Int. Cl.[6] G02B** *6/26*

**U.S. Cl. 385—24** **13 Claims**

1. Optical hybrid having a first and a second input port, respectively, for launching a first and a second light signal, and having a first and a second output port, respectively, for coupling out a first and a second output signal, the output signals including, respectively, a first and a second coherent product of each of the input signals, with a mutual phase difference of approximately 90°, characterized in that the hybrid comprises a 3×3 coupling device of three coupling waveguides having three inputs and three outputs, two of the inputs forming the input ports, and two of the outputs




forming the output ports, the power throughput of each of the input ports to each of the output ports being greater than 25%.

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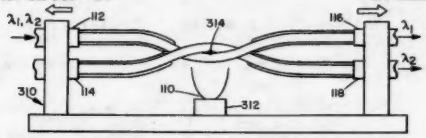
**5,491,764**

## NARROWBAND TWISTED OPTICAL FIBER WAVELENGTH DIVISION MULTIPLEXER

**Andong Hu, San Diego, and Douglas P. Bonnell, Vista, both of Calif., assignors to Tacan Corporation, Carlsbad, Calif.**

**Filed May 31, 1994, Ser. No. 251,086**
**Int. Cl.[6] G02B** *6/287*
**U.S. Cl. 385—24** **24 Claims**




**18**. A method for fabricating a narrow band optical fiber wavelength division multiplexer/demultiplexer ("WDM"), said WDM operating with a first light having a first wavelength and a second light having a second wavelength that is different from said first wavelength, said first and second wavelengths being in a range of 1400 nanometers ("nm") to 1600 nm, said method comprising:

selecting a first optical fiber and a second optical fiber of substantially the same length and diameter, each said first and second optical fiber having a core and a cladding surrounding said core, said core and said cladding both being unetched;

twisting said first and second optical fibers about one another to create a twisted pair of optical fibers to facilitate fusing said optical fibers together, said twisted pair having a twist midpoint;

heating said twisted pair of optical fibers by a heat source and simultaneously axially stretching said first and second optical fibers by a pair of fiber securing devices moving in an opposite direction from one another, thereby fusing said twisted pair of optical fibers together;

maintaining said heat source in substantially the same position relative to said twist midpoint while said twisted pair is being heated and axially stretched; and

stopping said heating and stretching of said twisted pair of optical fibers at a predetermined total draw distance, thereby forming said narrow band

optical fiber WDM.

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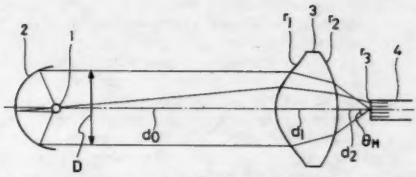
**5,491,765**

## LIGHT SOURCE DEVICES FOR ENDOSCOPES

**Shinya Matsumoto, Tokyo, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan**

**Continuation-in-part of Ser. No. 162,260, Dec. 7, 1993, abandoned. This application Sep. 30, 1994, Ser. No. 316,029**
**Claims priority, application Japan, Dec. 8, 1992, 4-351431**
**Int. Cl.[6] G02B** *6/36*
**U.S. Cl. 385—33** **6 Claims**

**1**. A light source device for endoscopes comprising: a light source and a collector optical system of said light source device for collecting rays emitted from said light source onto an end surface




of incidence of a light guide fiber bundle: wherein said collector optical system satisfies the following condition (1) and comprises lens components which have aspherical surfaces at least on the side of said light source, and an aspherical lens component disposed on the closest to said light source satisfies the following condition (3):

$$\sin\theta \leqq G(\theta) < \tan\theta \quad (1)$$

$$0.6 < (n-1)f/r_1' < 15 \quad (3)$$

wherein the reference symbol n represents a refractive index of said aspherical lens components, the reference symbol $r_1'$ denotes a radius of curvature on a reference sphere of said aspherical surface, the reference symbol f designates a focal length of said collector optical system as a hole, the reference symbol h represents a height of incidence of a ray which is emitted from said light source in parallel with an optical axis and made incident on said collector lens system, the reference symbols θ denotes an angle of emergence, from said collector optical system, of said ray which has the height of incidence h, the reference symbol G(θ) represents a quotient of h/f, and wherein said aspherical surface has a shape which is expressed by the formula shown below:

$$X = CY^2/(1+(1-PC^2Y^2)^{1/2}) + BY^2 + EY^4 + FY^6 + GY^8 + HY^{10} + IY^{12}$$

wherein the X axis is taken as the optical axis, the Y axis is taken on a plane parpendicular to the optical axis, the origin is taken as an intersection between the optical axis and the aspherical surface, the reference symbol C represents a curvature of a reference sphere of said aspherical surface, and the reference symbols P, B, E, F, G and H designate coefficients for expressing said aspherical surface, whereas $r_1'$ is expressed as ½B when both C and P are zero.

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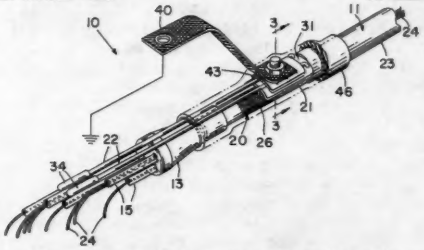
**5,491,766**

## BONDING ASSEMBLY FOR FIBER OPTIC CABLE AND ASSOCIATED METHOD

**Van L. Huynh, Garner; Robert M. Bower, Cary; Steven D. Griffin, Apex, and Deborah A. Mickus, Raleigh, all of N.C., assignors to Raychem Corporation, Menlo Park, Calif.**

**Continuation of Ser. No. 48,721, Apr. 16, 1993, abandoned. This application Aug. 30, 1994, Ser. No. 298,234**
**Int. Cl.[6] G02B** *6/36;* **H01R** *4/66*
**U.S. Cl. 385—100** **36 Claims**




**1**. A bonding assembly for a fiber optic cable of the type including an elongate core, a metallic shield surrounding the core, at least one strength member extending longitudinally adjacent the shield, and a jacket surrounding the shield and the at least one strength member, the fiber optic cable having a portion of the jacket removed thereby exposing the underlying shield and the at least one strength member, said bonding assembly comprising:

a base member having an end adapted to be inserted between an exposed shield portion and a corresponding underlying core portion of the fiber optic cable;

a shield clamping member adapted to overlie the exposed shield portion and cooperate with said base member for clamping the exposed shield portion therebetween;

a strength member clamping means member adapted to overlie an exposed portion of the at least one strength member and cooperate with said shield clamping member for clamping the exposed portion of the at least one strength member therebetween so that the exposed portion of the at least one strength member first extends in an outward direction and then extends in a generally longitudinal direction; and

connecting means adapted for connecting together said base member, said shield clamping member, and said strength member clamping member.

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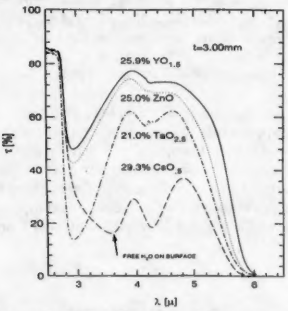
**5,491,767**

**GERMANATE GLASS FOR MID-INFRARED MEDICAL OPTICAL FIBER**

**Donald M. McPherson, 6018 Colby St., Oakland, Calif. 94618, and Steven C. Murray, 1536 San Antonio St., Menlo Park, Calif. 94025**

**Filed May 6, 1994, Ser. No. 239,247**
**Int. Cl.[6] G02B** *6/02;6/16*
**U.S. Cl. 385—123** **34 Claims**




**1**. A glass optical fiber for surgical laser transmission at a wavelength range of approximately 2.5 μm to 3.0 μm comprising a germanate glass substantially free of anions other than oxygen, and substantially free of As, Ba, Be, Bi, Cd, In, Pb, Sb, and Tl and capable of transmitting a useful aim beam to direct the surgical laser.

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**5,491,768**

**OPTICAL WAVEGUIDE EMPLOYING MODIFIED GALLIUM ARSENIDE**

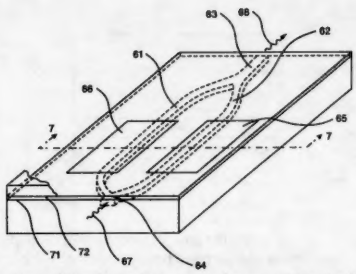
**Kam T. Chan, Windsor, Calif., assignor to The Chinese University of Hong Kong, Hong Kong, Hong Kong**

**Filed Jul. 27, 1994, Ser. No. 281,386**
**Int. Cl.[6] G02B** *6/134*
**U.S. Cl. 385—132** **22 Claims**

**11**. An optical modulator comprising:

(a) a substrate of substantially III-V material; and

(b) first and second channel waveguides, said first and second channel waveguides each comprising an ion-implanted region within said substrate produced by MeV ion implantation and rapid thermal annealing, said ion-implanted region exhibiting crystalline defects without additional contribution of carriers from the ions such that a higher refractive index exists than in surrounding regions, said first and second channel waveguides being spaced apart sufficiently at an electrode region so as not to interact optically, said first and second channel waveguides being joined in a first common waveguide at an input prior to




the electrode region and at a second common waveguide at an output past the electrode region; and

(c) electrical contacts on the surface of said first and second channel waveguides in the electrode region for introducing a modulating voltage and thus controlling the optical modulation of light travelling in the first and second channel waveguides by means of electro-optic effect.

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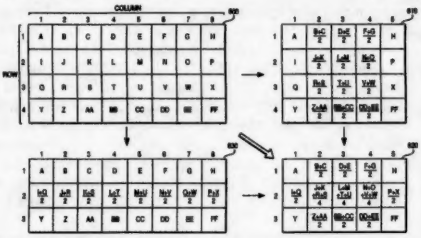
**5,491,769**

**METHOD AND APPARATUS FOR VARIABLE MINIFICATION OF AN IMAGE**

**Christian H. L. Moller, Austin, Tex., assignor to International Business Machines Corporation, Armonk, N.Y.**

**Continuation of Ser. No. 897,181, Jun. 11, 1992, abandoned. This application Sep. 12, 1994, Ser. No. 304,979**
**Int. Cl.[6] G06F** *15/00*
**U.S. Cl. 395—139** **18 Claims**




**1**. A method of shrinking an image stored in a first array comprising the steps of:

a) separating said first array into a plurality of rows, each row having a first plurality of data elements, each of said first plurality of data elements having a value; and

b) separately shrinking each row from the first plurality of data elements in said first array to a second plurality of data elements in a second array including the steps of:

i) sequentially associating each of said second plurality of data elements with at least one data element within only said first plurality of data elements; and

ii) sequentially calculating the value of each of said second plurality of data elements from values of associated ones of said first plurality of data elements.

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**5,491,770**

**COPOLYMERS FOR OPTICAL FIBERS**

**James A. Bonafini, Jr., 77 Pratt St., Lunenburg, Mass. 01887**

**Filed Feb. 24, 1995, Ser. No. 394,682**
**Int. Cl.[6] G02B** *6/00;* **C08F** *120/18*
**U.S. Cl. 385—145** **9 Claims**

**1**. An optical cladding formed of a copolymer that is the polymerization product of a mixture comprising a fluorinated itaconate, and an alkyl (meth)acrylate.

## 5,491,771

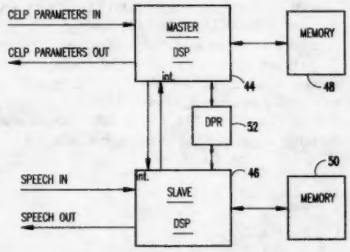
## REAL-TIME IMPLEMENTATION OF A 8KBPS CELP CODER ON A DSP PAIR

**Prabhat K. Gupta, Germantown, Md.; Allan Lamkin, Arlington, Va., and Walter R. Kepley, III, Gaithersburg, Md., assignors to Hughes Aircraft Company, Los Angeles, Calif.**

**Filed Mar. 26, 1993, Ser. No. 37,193**

**Int. Cl.[6] G10L** *3/02;9/00*

**U.S. Cl. 395—2.32** **5 Claims**




1. A codebook excited linear prediction (CELP) codec comprising a master processor receiving and generating CELP parameters and a slave processor receiving speech samples and outputting regenerated speech, said master and slave processors communicating via mutually connected interrupts and a dual port random access memory (RAM) connected between said master and slave processors for temporarily storing messages passed between said master and slave processors, said master and slave processors sharing a stochastic and adaptive code book search, said master processor performing encoding of speech processed by said slave processor and stored in said dual port RAM based on said code book search, and said slave processor performing input buffering and speech decoding based on the CELP parameters generated by said master processor and stored in said dual port RAM.

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## 5,491,772

## METHODS FOR SPEECH TRANSMISSION

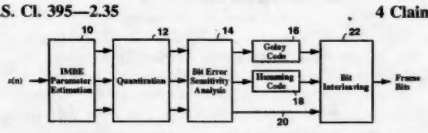
**John C. Hardwick, Somerville, and Jae S. Lim, Winchester, both of Mass., assignors to Digital Voice Systems, Inc., Burlington, Mass.**

**Continuation of Ser. No. 58,641, May 6, 1993, abandoned, which is a continuation of Ser. No. 802,142, Dec. 3, 1991, Pat. No. 5,247,579, which is a continuation-in-part of Ser. No. 624,878, Dec. 5, 1990, Pat. No. 5,226,084. This application May 3, 1995, Ser. No. 434,427**

**The portion of the term of this patent subsequent to Jul. 6, 2010, has been disclaimed.**

**Int. Cl.[6] G10L** *5/00*

**U.S. Cl. 395—2.35** **4 Claims**




1. A method of encoding speech, the method comprising the steps of:

breaking the speech into a plurality of time segments each representing a time segment of the speech;

estimating a set of model parameters for each of the time segments;

quantizing the set of model parameters to produce quantized model parameters;

encoding some of the quantized model parameters using error correction codes, the encoding comprising the steps of

using first and second types of error correction codes, the first type possessing a higher level of redundancy than the second type;

encoding a first group and a second group of quantized model parameters, the first group of quantized model parameters being more sensitive to bit errors than the second group of quantized model parameters;

using the first type of error correction code to encode the first group of quantized model parameters; and

using the second type of error correction code to encode the second group of quantized model parameters; and

interleaving the encoded first group of quantized model parameters with the encoded second group of quantized model parameters and a third group of quantized model parameters, the third group of quantized model parameters being less sensitive to bit errors than the second group of quantized model parameters.

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## 5,491,773

## ENCODING SYSTEM COMPRISING A SUBBAND CODER FOR SUBBAND CODING OF A WIDEBAND DIGITAL SIGNAL CONSTITUTED BY FIRST AND SECOND SIGNAL COMPONENTS

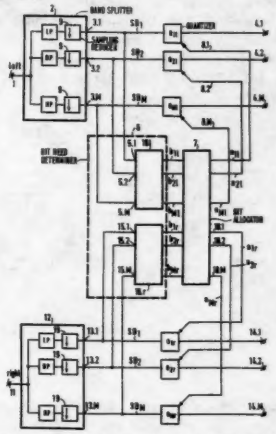
**Raymond N. J. Veldhuis, and Robbert G. Van Der Waal, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.**

**Continuation of Ser. No. 841,917, Feb. 25, 1992, abandoned. This application Mar. 28, 1994, Ser. No. 218,992**

**Claims priority, application European Pat. Off., Sep. 2, 1991, 91202221**

**Int. Cl.[6] G10L** *9/00*

**U.S. Cl. 395—2.38** **12 Claims**



1. An encoding system, for encoding a digital information signal having a first signal component and a second signal component, comprising

subband coding means for generating (a) a first subband signal in response to the first signal component, the first subband signal including a first signal block of q samples of the first subband signal, where q is a positive integer, and (b) a second subband signal in response to the second signal component, the second subband signal including a second signal block of q samples of the second subband signal, the first and the second subband signals being in a same subband and the first and second signal blocks being time-equivalent; and

quantizing means for quantizing said samples in said first and second signal blocks to form first and second quantized signal blocks, said samples in said first and second quantized signal blocks being represented by $n_{m1}$ and $n_{m2}$ bits respectively, and

said quantizing means comprises:

bit need means for determining a respective bit need b for said first signal block and a respective bit need b for said second signal block, said respective bit need for the first signal block

being related to the number of bits by which the samples in said first signal block should be represented, and said respective bit need for the second signal block being related to the number of bits by which the samples in said second signal block should be represented,

bit allocation means, responsive to the respective bit needs b for said first signal block and for said second signal block determined in the bit need means, for allocating a portion of an available quantity of bits to said samples in said first and second signal blocks to obtain the values $n_{m1}$ and $n_{m2}$ for the corresponding quantized first and second signal blocks,

determining means for determining, for one block of said first and second signal blocks, whether an initial allocation of bits to the samples in said one block is to be performed in the bit allocation means irrespective of the respective bit need b of said one block determined by said bit need means; and

means for producing a first control signal responsive to the determination by said determining means,

said bit allocation means being responsive to said first control signal, for initially allocating a first number of bits to the samples of said one block, and for initially allocating a second number of bits to the samples of the other block of said first and second signal blocks, irrespective of the respective bit need b of said other block determined by said bit need means.

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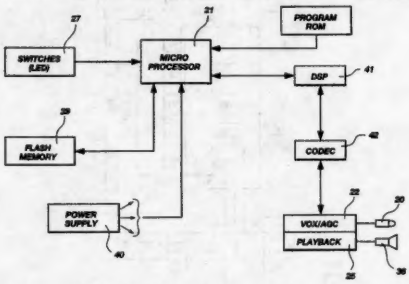
## 5,491,774
## HANDHELD RECORD AND PLAYBACK DEVICE WITH FLASH MEMORY

**Elwood G. Norris, Poway; Norbert P. Daberko, Oceanside, and Steven T. Brightbill, San Diego, all of Calif., assignors to Comp General Corporation, Poway, Calif.**

**Filed Apr. 19, 1994, Ser. No. 229,731**
**Int. Cl.[6] G10L *9/00*; G11B *27/031***
**U.S. Cl. 395—2.79** **22 Claims**




1. A record/playback device for use with a removable, interchangeable, flash memory recording medium which enables extended recording comparable with tape cassette dictating equipment, said device comprising:

a housing;

a microphone element coupled to the housing and configured to receive and process sound into electrical signals;

control circuitry coupled to the microphone element and including signal input circuitry, amplification circuitry, analog-to-digital conversion circuitry, memory control circuitry, signal output circuitry and control logic circuitry for performing record and playback functional operations with respect to the electrical signals and other regulated components of the record/playback device;

said switch means coupled to the control circuitry for selecting the desired functional operations to be performed;

a receiving socket electrically coupled to the memory control circuitry and configured for electrical coupling with a flash memory module which operates as sole memory of the received processed sound electrical signals and is capable of retaining recorded digital information for storage in nonvolatile form;

a speaker coupled to the control circuitry for playback of recorded digital information; and

a power source coupled to the control circuitry for supplying electrical power to the device.

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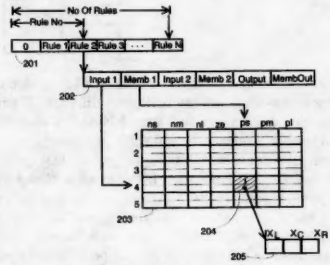
## 5,491,775
## MICROCONTROLLER FUNCTION SHAPES FUZZY LOGIC PROCESSING MODULE USING SELECTABLE STORED MEMBERSHIP

**Dinu P. Madau, Dearborn; Lee A. Feldkamp, Plymouth; Steven H. Seippel; Fumin Yuan, both of Canton, and Leighton I. Davis, Ann Arbor, all of Mich., assignors to Ford Motor Company, Dearborn, Mich.**

**Continuation of Ser. No. 85,799, Jul. 6, 1993, abandoned. This application Sep. 22, 1994, Ser. No. 310,894**
**Int. Cl.[6] G06G *7/00***
**U.S. Cl. 315—3** **4 Claims**




1. A digital fuzzy logic system comprising:

a source of a plurality of input signal values;

a processor;

a memory connected to said processor for storing data and for further storing instructions which are executable by said processor for manipulating said data, and

a utilization device connected to said processor and responsive to a digital output signal value produced by said processor;

wherein said processor and said memory operate cooperatively to form a fuzzy logic controller comprising:

means for processing said input signal values into a corresponding set of input integer values;

means for storing plural sets of function definition values,

means for storing instructions for performing a plurality of different standard membership functions, each of said functions when executed producing a degree-of-membership value in accordance with the combination of a supplied integer value and a specified one of said sets of function definition values;

means for storing data representative of a plurality of rules, each of said rules specifying at least:

(a) a first one of said input integer values,

(b) a first one of said sets of function definition values,

(c) a first one of said standard membership functions,

(d) a second one of said set of function definition values, and

(e) a second one of said standard membership functions;

means responsive to each given one of said rules for forming a strength value for said rule, said means comprising:

means for executing said first standard membership function specified in said given rule to produce an intermediate integer value in accordance with the first input integer value specified by said given rule and the first set of function definition values specified by said given rule, and

means for executing said second standard membership function specified by said given rule to produce said strength value for said given rule in accordance with said intermediate integer value and the second set of function definition values specified by said given rule; and

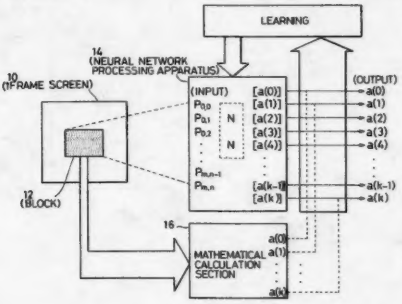
means for producing said digital output signal value by forming the weighted combination of the strength value formed in response to each of said plurality of rules.

5,491,776

## SIGNAL PROCESSING APPARATUS AND LEARNING METHOD THEREFOR

Ryoichi Dangi, Chiba, Japan, assignor to Kawasaki Steel Corporation, Hyogo, Japan

Continuation of Ser. No. 30,290, Mar. 24, 1993, abandoned.
This application Aug. 12, 1994, Ser. No. 290,080
Claims priority, application Japan, Aug. 5, 1991, 3-219133
Int. Cl.[6] G06F *15/18*
U.S. Cl. 395—11 1 Claim




1. A signal processing device for processing a portion of an input signal, the input signal portion having a predetermined size, the signal processing device comprising:

output selection means for selecting one of a first output signal and a second output signal as a final output signal based on a predetermined threshold;

first output signal generating means for computing the first output signal from the input signal portion based on a predetermined signal transform algorithm;

algorithm selection means for selecting one of a plurality of signal transform algorithms as the predetermined signal transform algorithm in the first output signal generating means;

a neural network operating concurrently with the first output signal generating means and generating the second output signal from the input signal portion based on a current set of learned weighted coefficients, the neural network comprising:

an input layer of neurons having a number of neurons equal to the predetermined size of the input signal portion;

an output layer of neurons generating the second output signal, each neuron of the output layer connected to each neuron of the input layer;

the current set of learned weighted coefficients, wherein each output layer neuron receives an output from each one of the input layer neurons by multiplying an output of each one of the input layer neurons by one of the current set of learned weighted coefficients;

learning means for generating the current set of learned weighted coefficients based on a comparison of the first and second output signals, the learning means operating concurrently with the first output signal generating means;

storage means for storing a plurality of sets of learned weighted coefficients, each set of learned weighted coefficients corresponding to one of the plurality of signal transform algorithms; and

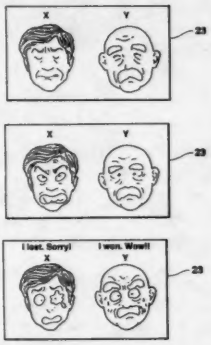
setting means for setting one of the plurality of sets of learned weighted coefficients as the current set of learned weighted coefficients based on the signal transform algorithm selected by the algorithm selection means.

5,491,777

## IMAGE DATA PROCESSOR

Tomokazu Mase, Omiya; Yoshiyuki Murata, Ome; Masahito Ariizumi, and Shinichiro Sato, both of Fussa, all of, Japan, assignors to Casio Computer Co., Ltd., Tokyo, Japan

Filed Nov. 8, 1993, Ser. No. 148,975
Claims priority, application Japan, Dec. 14, 1992, 4-332725; Dec. 28, 1992, 4-349427; Dec. 30, 1992, 4-360899
Int. Cl.[6] G06F *15/00*
U.S. Cl. 395—133 30 Claims




1. An image processor comprising:

first setting means in which at least two object images are previously stored, the respective object images each being representative of an object, the respective objects each including plural parts, each of said plural parts having plural part images, the object images each comprising a combination of plural part images each selected from among the plural part images of the respective parts of the object;

second setting means in which plural designating data are stored, said designating data designating the part images composing each of the object images which are stored in said first setting means;

determining means for determining which one of the at least two object images stored in said first setting means wins in a battle between the at least two object images, on the basis of the designating data stored in said second setting means; and

result display means for displaying the result of the determination by said determining means.

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5,491,778

## SYSTEM AND METHOD FOR PROVIDING VISUAL DISPLAY TRANSITION EFFECTS

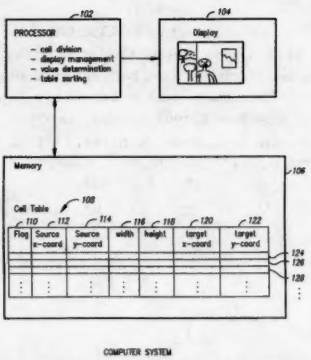
Robert D. Gordon, Sunnyvale; Joseph F. Sinnott, Jr., Palo Alto, and Lonnie S. Walling, Ben Lomond, all of Calif., assignors to International Business Machines Corporation, Armonk, N.Y.

Continuation of Ser. No. 972,696, Nov. 6, 1992, Pat. No. 5,414,805. This application Oct. 17, 1994, Ser. No. 324,196
Int. Cl.[6] G06T *3/00*
U.S. Cl. 395—133 22 Claims

1. A computer-based system for generating transition effects of source images into target image locations within a displayed image, comprising:

means for dividing a display of said displayed image into cells;

memory means for storing displayed data;




means for generating a cell table in said memory means, said cell table including a plurality of rows, each row corresponding to one of said cells, each row including: a first location field corresponding to a source cell location; a cell size identifier; and, a target location field corresponding to a target cell location;

means for selecting one of a plurality of transition effect functions;

means for solving said selected transition effect function for each row;

means for ordering said rows in accordance with said selected transition effect function solutions; and

means for placing cells of a source image into a target image location within said displayed image sequentially in accordance with said ordered rows of said cell table.

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**5,491,779**

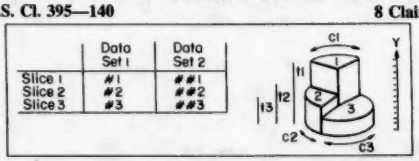
**THREE DIMENSIONAL PRESENTATION OF MULTIPLE DATA SETS IN UNITARY FORMAT WITH PIE CHARTS**

**Richard D. Bezjian, 50 Frost Rd., Belmont, Mass. 02178**

**Filed Apr. 3, 1992, Ser. No. 863,234**

**Int. Cl.[6] G06T** *17/10*

**U.S. Cl. 395—140** **8 Claims**




1. In a data processing system, a method of graphically displaying data in a pie figure comprising:

defining at least first and second data sets relative to plural identities, the second data set including at least one value which is unequal to at least one other value of the second data set;

defining the angles of plural pie slices, each pie slice corresponding to an identity, such that the angles are proportional to data of the first data set, the angles totalling 360°;

defining a second dimension of each pie slice such that the second dimensions are proportional to data of the second data set; and

generating a three dimensional display of the plural pie slices in a circular arrangement as a single pie figure, each pie slice having the defined angle and the defined second dimension.

**5,491,780**

**SYSTEM AND METHOD FOR EFFICIENT COMPUTER WORKSTATION SCREEN UPDATES**

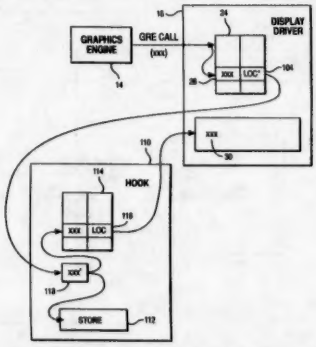
**Anthony Fyles, Winchester; Andrew Key, and Vincent Sethi, both of Southampton, all of, England, assignors to International Business Machines Corporation, Armonk, N.Y.**

**Continuation of Ser. No. 105,835, Aug. 12, 1993, abandoned. This application Aug. 25, 1994, Ser. No. 296,262**

**Claims priority, application United Kingdom, Sep. 15, 1992, 9219468**

**Int. Cl.[6] G06F** *12/00*

**U.S. Cl. 395—153** **11 Claims**




1. An improved subsystem for a computer workstation adapted for connection into a network of one or more other computers, said computer workstation including a screen, means for sending requests to the screen to update the contents of portions thereof, and means for transmitting the contents of said portions to other computers in the network, said improvement comprising:

means, responsive to said requests, for identifying said portions of the screen for updating by said requests;

means for selecting updated contents corresponding to said portions for transmissions to another computer; means for generating a list of entries, each corresponding to one of said portions;

means for detecting if any of said portions of said screen has been updated a first time and a second time between said transmissions; and

means for deleting from said list, upon said detecting, one of said entries corresponding to one of said portions updated said first time and overlapped by said one of said portions updated said second time.

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**5,491,781**

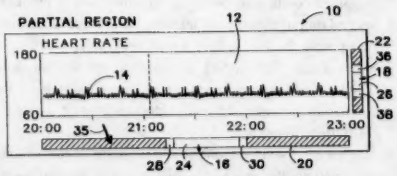
**METHOD AND APPARATUS FOR DISPLAYING A GRAPHIC IMAGE**

**Marco D. Gasperina, Tigard, Oreg., assignor to Hewlett-Packard Company, Palo Alto, Calif.**

**Filed Mar. 12, 1993, Ser. No. 31,780**

**Int. Cl.[6] G06F** *3/14*

**U.S. Cl. 395—157** **23 Claims**




1. A method for displaying a portion of a computer file comprising the steps of:

displaying a selected portion of the file in a window having a scroll box on one side thereof for varying which portion of the file is displayed in the window;

changing the length of the scroll box, in response to a user; and

changing the scale of the displayed portion of the file proportional to and in response to the change in length of the scroll box.

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**5,491,782**

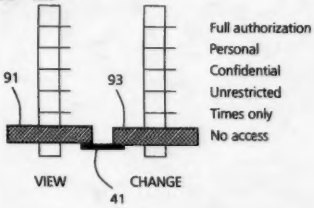
## METHOD AND APPARATUS FOR LOOSELY GANGING SLIDERS ON A USER INTERFACE OF A DATA PROCESSING SYSTEM

**Chen D. King, Colleyville; Raymond E. Lee, Irving; Peter Scannell, Carrollton, and Robert J. Torres, Colleyville, all of Tex., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed Jun. 29, 1993, Ser. No. 84,824**

**Int. Cl.[6] G06F** *3/00*

**U.S. Cl. 395—159** **8 Claims**




**5**. An apparatus for displaying related parameters on a user interface of a data processing system; comprising:

a) means for displaying first and second sliders, said first slider being capable of being moved along a first path and said second slider being capable of being moved along a second path, said first and second paths being separate from each other;

b) means for displaying a member coupled to said first slider and extending toward said second path of said second slider so as to contact a portion of said second slider when one of said sliders moves with respect to the other of said sliders in a predetermined direction along said first or second path;

c) means for selecting and moving either said first slider along said first path or said second slider along said second path with an input device.

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**5,491,783**

## METHOD AND APPARATUS FOR FACILITATING INTEGRATED ICON-BASED OPERATIONS IN A DATA PROCESSING SYSTEM

**Thomas B. Douglas, Dallas, and Robert J. Torres, Colleyville, both of Tex., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed Dec. 30, 1993, Ser. No. 175,997**

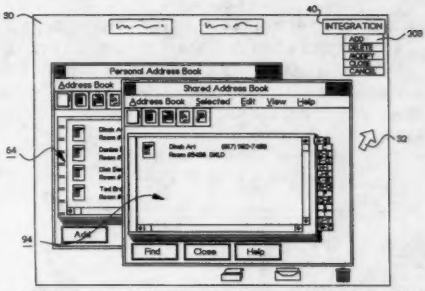
**Int. Cl.[6] G06F** *15/00*

**U.S. Cl. 395—159** **18 Claims**

**1**. A method of facilitating icon-based operations in a data processing system graphical user interface having a plurality of icons representative of either software objects or data-processing-implemented operations, comprising the data processing implemented steps of:

(a) allowing at least one software object to remain open and active in a visual display of said data processing system, said software object displaying a plurality of data items;

(b) providing, in said graphical user interface, a operator-selectable visual representation of an integrated operation association between (1) said at least one software object




which is open and active in said visual display of said data processing system and (2) at least one of said plurality of icons;

(c) monitoring for (1) operator selection of said visual representation of an integrated operation association, and (2) operator utilization of a graphical pointing device to select at least one of said plurality of data items;

(d) recording operator selection of said at least one of said plurality of data items; thereafter

(e) monitoring for operator utilization of said graphical pointing device to select at least one of said plurality of icons;

(f) performing a particular data-processing-implemented operation involving (1) recorded operator selection of said at least one of said plurality of data items, and (2) said software object or data-processing-implemented operation represented by the selected ones of said plurality of icons.

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**5,491,784**

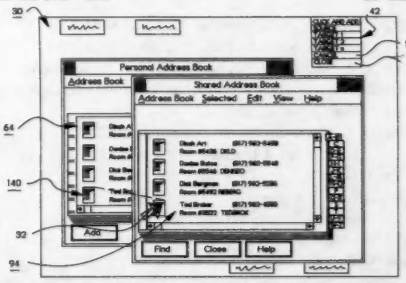
## METHOD AND APPARATUS FOR FACILITATING INTEGRATION OF SOFTWARE OBJECTS BETWEEN WORKSPACES IN A DATA PROCESSING SYSTEM GRAPHICAL USER INTERFACE

**Thomas B. Douglas, Dallas, and Robert J. Torres, Colleyville, both of Tex., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed Dec. 30, 1993, Ser. No. 175,998**

**Int. Cl.[6] G06F** *15/00*

**U.S. Cl. 395—159** **33 Claims**




**1**. In a data processing system graphical user interface which simultaneously displays a plurality of software objects, a method of facilitating operator integration of items between software objects, comprising the data processing implemented steps of:

allowing operator selection of a source software object and a target software object within said data processing system;

recording said operator selection; thereafter

monitoring operator input from a graphical pointing device for selection of items present in said source software object; and

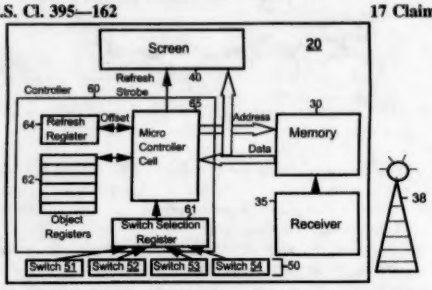
automatically copying items selected by said operator to said target software object, while said graphical pointing device is maintained within said source software object.

**5,491,785**

## INFORMATION RETRIEVAL DEVICE FOR DISPLAYING AND DIRECTLY REFRESHING THE DISPLAY OF A DYNAMICALLY MODIFIABLE DOCUMENT

**Christopher J. Robson, and Gregory J. May, both of Corvallis, Oreg., assignors to Hewlett-Packard Company, Palo Alto, Calif.**

**Filed Sep. 30, 1993, Ser. No. 130,075**
**Int. Cl.[6] G06F** *15/00*
**U.S. Cl. 395—162** **17 Claims**




8. A receiver for receiving a document from a transmitter:

memory for storing said document received by said receiver;

a plurality of input selector switches;

a display screen;

controller circuitry connected to said memory, said input selector switches, and said display screen, said controller circuitry determining which portion of said document to display on said display screen, responsive to said plurality of input selector switches;

said controller circuitry refreshing said display screen directly from said memory, said controller circuitry further comprising:

a microcontroller cell;

an object register for storing a plurality of hypertext object states; and

a switch selection register for storing a current switch status.

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**5,491,786**

## METHOD AND SYSTEM FOR MANAGEMENT OF UNITS WITHIN A DATA PROCESSING SYSTEM

**Patrick K. Egan, Rochester, and Gene A. Ohnstad, Oronoco, both of Minn., assignors to International Business Machines Corporation, Armonk, N.Y.**

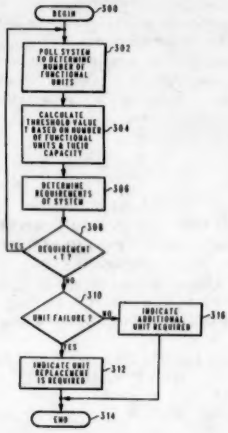
**Filed Mar. 12, 1993, Ser. No. 30,760**
**Int. Cl.[6] G06F** *11/00;9/00*
**U.S. Cl. 395—180** **22 Claims**

1. A method in a data processing system for managing a plurality of units, wherein said data processing system requires a selected capacity provided by a number of said plurality of units, said method comprising:

dynamically polling said plurality of units to determine a capacity of said plurality of said units;

dynamically determining a requirement of said data processing system for said plurality of units; and

generating an indication that a condition exists in which at least one of said plurality of units should be replaced only if said determined requirement of said data processing system is greater than said determined capacity of said plurality of units and one of said plurality of units has failed, wherein replacement of one of said plurality of units is not required unless data processing system demand exceeds a capacity of said plurality of units.

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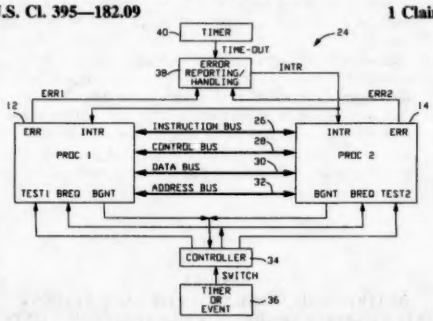
**5,491,787**

## FAULT TOLERANT DIGITAL COMPUTER SYSTEM HAVING TWO PROCESSORS WHICH PERIODICALLY ALTERNATE AS MASTER AND SLAVE

**Seyed H. Hashemi, Mission Viejo, Calif., assignor to Unisys Corporation, Blue Bell, Pa.**

**Filed Aug. 25, 1994, Ser. No. 296,302**
**Int. Cl.[6] G06F** *11/00*
**U.S. Cl. 395—182.09** **1 Claim**




1. A method of operating a fault tolerant digital computer system of the type which includes first and second processors with each such processor having a) a standalone master operating mode and b) a slave mode for monitoring the other processor, said method comprising the steps of:

running said system in one state for a predetermined time interval where said first processor is in said master mode and said second processor is in said slave mode;

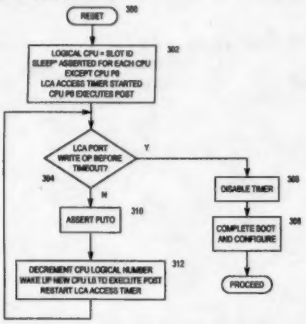
running said system in an opposite state for another predetermined time interval where said second processor is in said master mode and said first processor is in said slave mode; and,

periodicly switching the operation of said system from said one state to said opposite state, and vice-versa, such that said first and second processors are in said master mode during respective time intervals which are interleaved.

## 5,491,788
## METHOD OF BOOTING A MULTIPROCESSOR COMPUTER WHERE EXECUTION IS TRANSFERRING FROM A FIRST PROCESSOR TO A SECOND PROCESSOR BASED ON THE FIRST PROCESSOR HAVING HAD A CRITICAL ERROR

**Darren J. Cepulis, Houston, and Louis R. Gagliardi, Tomball, both of Tex., assignors to Compaq Computer Corp., Houston, Tex.**

**Filed Sep. 10, 1993, Ser. No. 119,424**
**Int. Cl.[6] G06F** *11/00*
**U.S. Cl. 395—182.11** **8 Claims**




1. A method for booting a multiprocessor computer system with a processor, comprising the steps of:

maintaining a log of predetermined critical errors which have occurred on the computer system;

resetting the computer system and beginning execution of initialization operations on a first processor of the multiprocessor computer system;

determining if said first processor has previously had one of said predetermined critical errors; and

if one of said predetermined critical errors had occurred, disabling said first processor and transferring execution to a second processor of the multiprocessor computer system to perform initialization operations.

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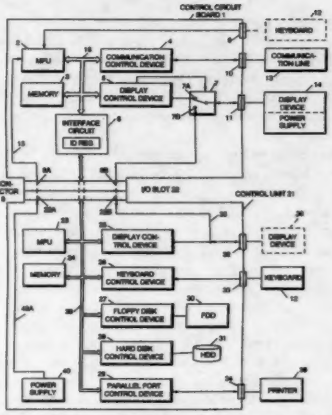
## 5,491,789
## DATA PROCESSING APPARATUS AND CONTROL CIRCUIT UNIT CONNECTED THERETO

**Matsumi Aramaki; Yasukazu Isobe, both of Fujisawa, and Tetsune Toyokawa, Yokohama, all of, Japan, assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed Apr. 10, 1991, Ser. No. 683,466**
**Claims priority, application Japan, May 10, 1990, 2-118857**
**Int. Cl.[6] G06F** *11/34*
**U.S. Cl. 395—183.01** **4 Claims**

1. In a control circuit board used to couple a user terminal to a first data processing apparatus and said control circuit board including a microprocessor, a display control device, a communication control device connectable to the first data processing apparatus through a communication line, and a system bus connecting said microprocessor, said display control device and said communication control device, a control circuit unit for allowing the control circuit board to access information from the first data processing apparatus and a second data processing apparatus; said control circuit unit comprising:

a connector, operatively coupled to the control circuit board, for mounting in an input/output connecting slot of the second data processing apparatus; said connector includes an input connector element for transmitting an inhibit signal connected to said microprocessor; and said microprocessor, at powered on, samples the connector element to determine if the inhibit signal is supplied to said input connector element and terminating its operation after performing a diagnostic test of said control circuit unit; if said inhibit signal is detected;




an interface circuit means for coupling the system bus of the control circuit board with a system bus of the second data processing apparatus; said interface circuit means connected between said system bus and the connector; and

a switching means operatively coupled to the connector and the display control device; said switching means responsive to a control signal to enable information provided from the first data processing apparatus through the control circuit board or from the second data processing apparatus to be displayed.

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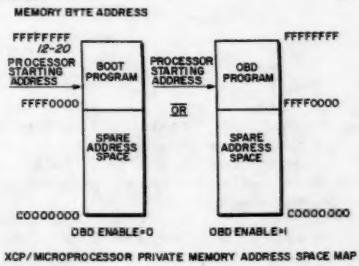
## 5,491,790
## POWER-ON SEQUENCING APPARATUS FOR INITIALIZING AND TESTING A SYSTEM PROCESSING UNIT

**James W. Keeley, Nashua, N.H.; Richard A. Lemay, Carlisle, Mass.; Chester M. Nibby, Jr., Beverly, Mass.; Keith L. Petry, North Reading, Mass., and Thomas S. Hirsch, Bedford, Mass., assignors to Bull HN Information Systems Inc., Billerica, Mass.**

**Continuation of Ser. No. 775,864, Oct. 15, 1991, abandoned.**
**This application Apr. 22, 1994, Ser. No. 231,856**
**Int. Cl.[6] G06F** *9/445*
**U.S. Cl. 395—183.12** **12 Claims**




XCP/MICROPROCESSOR PRIVATE MEMORY ADDRESS SPACE MAP

1. Power on sequence apparatus for use with a processing unit which couples to a system bus and issues commands to any one of a plurality of units coupled in common with said processing unit for carrying out data processing operations, said processing unit including a microprocessor coupled to a synchronous local bus for issuing said commands to said system bus, said apparatus comprising:

an electrically erasable programmable read only memory (EEPROM) unit including at least first and second groups of addressable locations, each first and second groups including a starting location normally referenced by said microprocessor for executing a boot-up routine sequence when said processing unit is powered on and placed in an initial state,

said first group of locations assigned an address space addressable by said microprocessor when in said initial state, said first group of locations storing routines of on-board diagnostic (OBD) routines for testing said processing unit; and,

said second group of addressable locations having the same address space addressable by said microprocessor when in said initial state for storing said boot-up routine sequence; and,

control circuit means coupled to said EEPROM unit and to said system bus, said control circuit means including mode indicator means having a plurality of states, said mode indicator means being switched to a first state in response to a signal from said system bus generated when said processing unit is powered on, said mode indicator mean when in said first state supplying at least one signal for causing said EEPROM unit to allow said microprocessor to address only said first group of locations including said starting location, storing said OBD routines for enabling both testing and initialization of said processing unit and when said mode indicator means is switched from said first state to a second one of said plurality of states upon completing said testing for supplying a signal for causing said EEPROM unit to allow said microprocessor to address only said second group of locations including said starting location of said boot-up sequence without having to change normal microprocessor addressing for said boot-up routine sequence.

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**5,491,791**

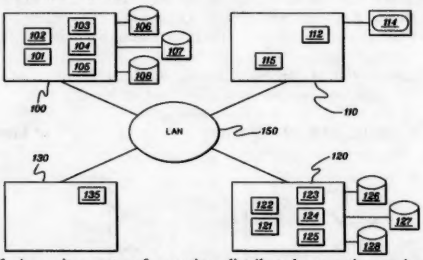
## SYSTEM AND METHOD FOR REMOTE WORKSTATION MONITORING WITHIN A DISTRIBUTED COMPUTING ENVIRONMENT

**David A. Glowny; John C. Kistenmacher, both of Naugatuck, Conn.; Caryl M. Rahn, Poughkeepsie, N.Y., and Jerry C. Thomas, Danbury, Conn., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed Jan. 13, 1995, Ser. No. 372,786**

**Int. Cl.[6] G06F** *11/00*

**U.S. Cl. 395—183.13** **19 Claims**




1. A monitor system for use in a distributed computing environment having a plurality of workstations, including a local workstation and a remote workstation, interconnected by a network, said monitor system for monitoring said remote workstation from said local workstation, said monitor system comprising:

communication means at each workstation of said plurality of workstations for communicating via said network with other workstations of said plurality of workstations;

a diagnostic routine at said remote workstation for monitoring a configuration characteristic of said remote workstation and for providing based thereon a report file, said diagnostic routine being responsive to an execute command sent from said local workstation to said remote workstation via said communication means, said communication means being operable to initiate from said local workstation the execution of said diagnostic routine and to transfer said report file from said remote workstation to said local workstation;

monitor means at said local workstation for automatically and periodically, in accordance with a diagnostics schedule, generating said execute command to be sent to said remote workstation via said communication means; and

analysis means at said local workstation for analyzing the report file transferred from said remote workstation to said local workstation.

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**5,491,792**

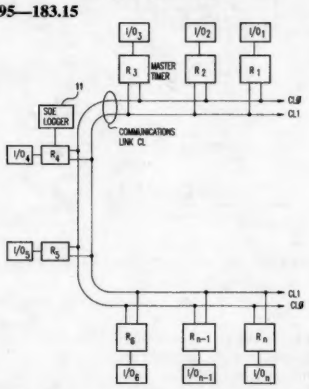
## SEQUENCE OF EVENTS SYSTEM USING A REDUNDANT ANALOG I/O BOARD SYSTEM

**James S. Grisham, Midlothian, and Billy R. Slater, Plano, both of Tex., assignors to Forney International, Inc., Carrollton, Tex.**

**Filed Sep. 23, 1994, Ser. No. 311,115**

**Int. Cl.[6] G06F** *11/20*

**U.S. Cl. 395—183.15** **11 Claims**




1. A system for recording sequence-of-events data in a process control system comprising in combination:

a processor, a change-of-status detector, a clock, and a sequence-of-events buffer;

means for coupling a plurality of process signal inputs to said change-of-status detector;

said change-of-status detector including means to generate an input to said processor in response to a change in status of any of said process signal inputs;

said change-of-status detector responding to high frequency, unfiltered changes in status in said any of said process signal inputs to generate said input to said processor;

said processor reading a status of each of said process signal inputs coupled to said change-of-status detector in response to said input to said processor and storing said status of each of said process signal inputs in said sequence-of-events buffer with a time-of-event tag from said clock.

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**5,491,793**

## DEBUG SUPPORT IN A PROCESSOR CHIP

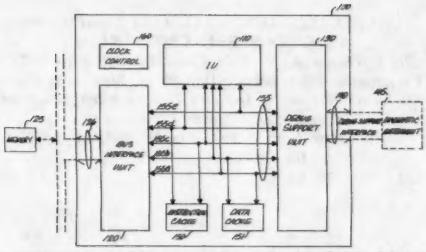
**M. Somasundaram; Akira Watanabe, both of San Jose; James D. Huey, Sunnyvale, and Dinesh Maheshwari, Santa Clara, all of Calif., assignors to Fujitsu Limited, Japan**

**Continuation of Ser. No. 924,699, Jul. 31, 1992, abandoned. This application Oct. 11, 1994, Ser. No. 321,576**

**Int. Cl.[6] G06F** *11/30*

**U.S. Cl. 395—183.21** **44 Claims**

1. A single chip central processing unit (CPU) for real-time debugging connected between an external memory for storing data and instructions and an external diagnostic instrument for setting breakpoints in the CPU and obtaining a trace of instructions processed by the CPU, the CPU comprising:




a processor comprising means for processing data and instructions fetched from the external memory, means for comparing a breakpoint condition received from the external diagnostic instrument to the data and instructions being processed by the processing means, and means for notifying the external diagnostic instrument with an acknowledgement signal when the breakpoint condition matches the data and instructions;

a first bus interface unit for coupling instructions and data between the processor and the external memory before and after the breakpoint condition over a first bus connected between the first bus interface unit and the external memory; and

a second bus interface unit for coupling instructions and data between the processor and the external diagnostic instrument after the breakpoint condition has occurred and transmitting status information to the external diagnostic instrument before, during and after the breakpoint condition over a second bus connected between the second bus interface unit and the external diagnostic instrument.

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**5,491,794**

## FAULT PROTECTION USING MICROPROCESSOR POWER UP RESET

**Chun H. Wu, Singapore, Taiwan, Prov. of China, assignor to Thomson Consumer Electronics, S.A., France**

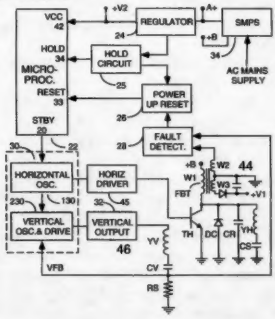
**Continuation of Ser. No. 894,372, Jun. 4, 1992, abandoned.**

**This application Jan. 23, 1995, Ser. No. 376,691**

**Claims priority, application United Kingdom, Jun. 27, 1991, 9113924**

**Int. Cl.[6] G06F *11/00***

**U.S. Cl. 395—182.21** **18 Claims**




1. A video display device having fault protection apparatus for controlling said video display device, said fault protection apparatus comprising:

a horizontal deflection circuit;

a horizontal oscillator coupled to said horizontal deflection circuit and controlled to be operative in a run mode and inoperative in a standby mode;

a run mode power supply energized by operation of said deflection circuit for supplying power to a run mode load;

a fault detection circuit having at least one sensing input coupled to said run mode load to detect a fault condition and generating a reset signal responsive to detection of said fault condition; and

a microprocessor control circuit having a reset input coupled to said reset signal and having an output signal coupled for controlling said operation of said horizontal oscillator, said microprocessor enabling said run mode absent detection of said fault condition and initiating said standby mode responsive to detection of said fault condition in said run mode load, said deflection circuit, said run mode power supply and said run mode load being thereby deactivated.

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**5,491,795**

## WINDOW MANAGEMENT SYSTEM WITH A HIERARCHICAL ICONIC ARRAY AND MINIATURE WINDOWS

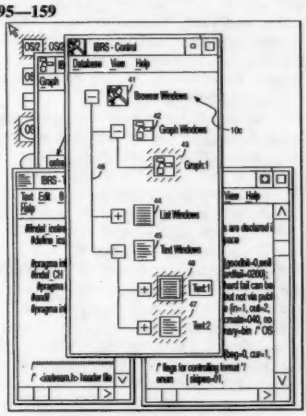
**Phillip Beaudet, Pickering; Eduardus A. T. Merks, North York; Martin Rendall, Scarborough, and Roger Spall, North York, all of, Canada, assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed May 2, 1994, Ser. No. 236,799**

**Claims priority, application Canada, May 4, 1993, 2095448**

**Int. Cl.[6] G06F *3/00***

**U.S. Cl. 395—159** **17 Claims**




1. A control container for performing window management operations in a computer system having a display and locator input device, said container comprising:

means for arranging a plurality of icons in a displayed hierarchical array, each displayed icon representing a separate product window, wherein said array contains a first icon;

means for receiving a window management operation on said first icon from said locator input device; and

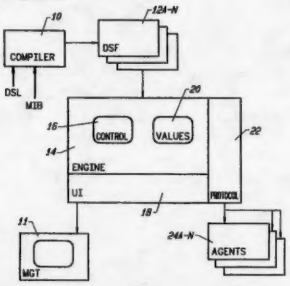
first means for linking said first icon to said product window to enable transmission of said window management operation to said product window.

## 5,491,796

## APPARATUS FOR REMOTELY MANAGING DIVERSE INFORMATION NETWORK RESOURCES

James Wanderer; Claus Cooper, both of Mountain View; Mark Gerolimatos, San Carlos, and Michele Chen, Mountain View, all of Calif., assignors to Net Labs, Inc., Los Altos, Calif.

Filed Oct. 23, 1992, Ser. No. 965,350
Int. Cl.[6] G06F *11/30*
U.S. Cl. 395—200.09 12 Claims




1. An apparatus for remotely managing diverse information network resources, comprising:

a plurality of heterogeneous, remote devices of functionally diverse classes, each device providing raw information in one of a plurality of heterogeneous formats, wherein said format is specific to each device and to each device functional class;

a protocol module located at a network management site and in communication with said remote devices for scheduling remote device polls to optimize remote device polling and minimize use of said information network;

a values module located at said network management site for storing data obtained by polling said remote devices, wherein said data are representative by events that occur at said remote devices as the events occur over time, said values module being operable to store, retrieve, and manipulate said raw information, said values module including a time stamp for use in connection with recording a time of occurrence of said remote device events, processing time varying data from said stored remote device events, and for storing common groupings of said raw information;

a nonprocedural builder module located at said network management site and operable to generate a data specification module; said data specification module located at said network management site and operable to store information that specifies device content and behavior for each of said heterogeneous, functionally diverse, remote devices in the form of a device specific representation, wherein said representation appears to a user in the same format for each device within a device functional class even though each functional class may include a plurality of heterogeneous remote devices;

an engine located at said network management site, said engine being operable to read information stored in said data specification module and to generate said device specific representation for each of said remote devices therefrom and, based on the contents of said data specification module and said raw information from said remote devices, to control operation of said remote devices, to enable polls of said remote devices by said protocol module, to process said raw information in accordance with said information stored in said data specification module, to process said common groupings of said raw information stored in said values module from two or more of said remote devices to generate information characterizing inter-device performance therefrom, and to generate poll results for each of said remote devices in the form of said device specific representations; and

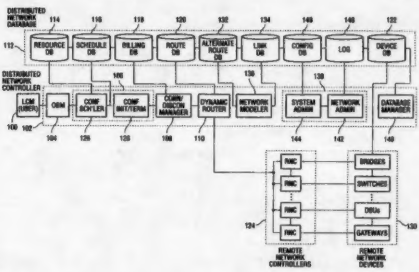
a user interface module located at said network management site, and, responsive to said engine, for displaying said device specific representations of said remote devices at said network management site as a user controlled virtual panel.

## 5,491,797

## SCHEDULABLE AUTOMATICALLY CONFIGURED VIDEO CONFERENCING SYSTEM

Phillip F. Thompson, Sheffield Lake, Ohio; Howard D. Finck, Farmington Hills, Mich.; Donald K. Sheppard, Canton, Mich., and Gregory G. DeHetre, Livonia, Mich., assignors to Qwest Communications, Denver, Colo.

Filed Nov. 30, 1992, Ser. No. 983,454
Int. Cl.[6] G06F *13/10;13/14*
U.S. Cl. 395—200.03 7 Claims




1. A videoconferencing network system for providing schedulable, automatic interconnectivity between a selectable group of a plurality of user videoconferencing sites connectable by public digital transmission network link paths, each having videoconferencing hardware including at least an audio/video receiver and a data service unit, said network system comprising:

user control means for providing the user with direct access to the network system and control over the user videoconferencing hardware and for generating user scheduling information and user site selection information;

a plurality of remote network devices automatically configurable to provide a plurality of network link path options, said plurality of remote network devices comprising:

a plurality of cross-connect switches selectively coupled together via the public digital transmission network; and

at least one bridge device coupled to a selected one of said plurality of cross-connect switches, said bridge device facilitating interactive video conferencing between more than two sites;

a distributed network controller for generating a set of network commands in response to said user scheduling and site selection information, said distributed network controller comprising:

an automatic conference scheduler coupled to said user control means, said automatic conference scheduler generating final conference scheduling data, including user selected times and sites;

a conference initiator/terminator coupled to said automatic conference scheduler;

a connection/disconnection manager coupled to said initiator/terminator; and

a dynamic router coupled to said connection/disconnection manager;

a distributed network database comprising:

a resource database coupled to said automatic conference scheduler, said resource database storing status information on all network resources;

a schedule database coupled to said automatic conference scheduler for storing conference schedule information generated by said automatic conference scheduler; and

a route database coupled to said dynamic router for storing information defining an optimum route to implement for each selected link path between the plurality of videoconferencing sites; and

a plurality of remote network controllers coupled to said dynamic router and to said plurality of remote network devices, for automatically configuring said plurality of remote network devices in response to said set of network commands;

wherein, the system allows a user to automatically schedule and monitor point-to-point and multi-point two-way video conferencing between the plurality of videoconferencing sites.

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**5,491,798**

## METHOD FOR NETWORK CALL MANAGEMENT

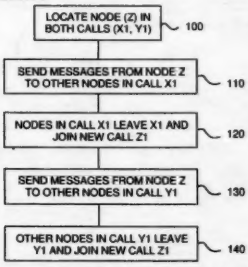
**Gordon W. Bonsall, Littleton; Howard S. Lambert, Hedge End; H. David Mitchell, Richmond Upon Thames, and Barry K. Aldred, Malmesbury Gardens, all of, United Kingdom, assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed Nov. 10, 1993, Ser. No. 150,675**

**Claims priority, application United Kingdom, Sep. 25, 1993, 9319851**

**Int. Cl.[6] G06F** *15/177*

**U.S. Cl. 395—200.04** **17 Claims**


LOCATE NODE (Z) IN BOTH CALLS (X1, Y1)
100
SEND MESSAGES FROM NODE Z TO OTHER NODES IN CALL X1
110
NODES IN CALL X1 LEAVE X1 AND JOIN NEW CALL Z1
120
SEND MESSAGES FROM NODE Z TO OTHER NODES IN CALL Y1
130
OTHER NODES IN CALL Y1 LEAVE Y1 AND JOIN NEW CALL Z1
140

**1**. A method of splitting an initial call that exists across an initial set of nodes into first and second calls across first and second disjoint subsets of the initial set, each node comprising a computer workstation in a computer network and including means responsive to messages from other computers in said network to join or leave a call, and each node maintaining a list of calls in which that node is participating, an entry in the list for a call including the identities of all the other nodes in that call, the method comprising the steps of:

producing at one node in said initial set a list of said first subset of nodes to be included in said first call, whereby said second call is to be between nodes in the initial set for but in said first subset;

said one node sending a message to each node in said first subset of nodes including instructions to leave said initial call and join said first call; and

each node upon receipt of said message performing the necessary actions to leave said initial call and join said first call.

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**5,491,799**

## COMMUNICATION INTERFACE FOR UNIFORM COMMUNICATION AMONG HARDWARE AND SOFTWARE UNITS OF A COMPUTER SYSTEM

**Ronald K. Kreuzenztein, Sunnyvale; Mark Vongnechten, Fremont, and Kai C. Wong, Sunnyvale, all of Calif., assignors to Amdahl Corporation, Sunnyvale, Calif.**

**Continuation of Ser. No. 816,865, Jan. 2, 1992, abandoned. This application Jul. 29, 1994, Ser. No. 282,777**

**Int. Cl.[6] G06F** *13/00*

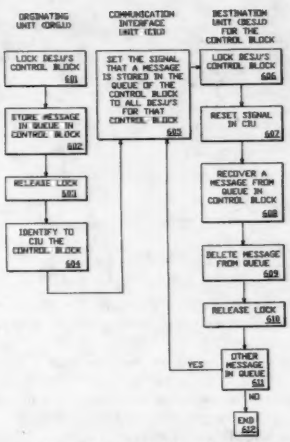
**U.S. Cl. 395—200.08** **1 Claim**

**1**. A communication method for use in a computer system, said computer system comprising units, a common store connected to and accessible by each of said units, a control block in said common store assigned to a group of said units and an interface unit connected to each of said units, said communication method comprising the steps of:

a) originating a lock by a sending unit for said control block;

b) storing a message in a queue in said control block by said sending unit;

c) releasing said lock by said sending unit for said control block;




d) issuing an identifying signal by said sending unit to said interface unit identifying that said sending unit has stored a message into said control block for said group of units;

e) setting a message signal in said interface unit which is received by said group of units assigned to said control block indicating that a message has been stored in said queue of said control block for said group of units;

f) originating a lock by a unit of said group of units receiving said message signal for said control block for said group of units;

g) resetting said message signal when said unit of said group of units has obtained said lock for said control block for said group of units;

h) retrieving a message by said unit from said queue in said control block for said group of units;

i) deleting said message retrieved by said unit from said queue in said control block for said group of units;

j) releasing said lock by said unit for said control block for said group of units;

k) setting said message signal in said interface means for said group of units which included said unit that has deleted said message from said queue in said control block for said group of units when a message remains in said queue after said unit has deleted said message from said queue in said control block for said group of units.

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**5,491,800**

## OBJECT-ORIENTED REMOTE PROCEDURE CALL NETWORKING SYSTEM

**Amy M. Goldsmith; David B. Goldsmith, both of Los Gatos, and Christopher E. Pettus, San Francisco, all of Calif., assignors to Taligent, Inc., Cupertino, Calif.**

**Filed Dec. 20, 1993, Ser. No. 169,795**

**Int. Cl.[6] G06F** *15/173;15/177*

**U.S. Cl. 395—200.12** **46 Claims**

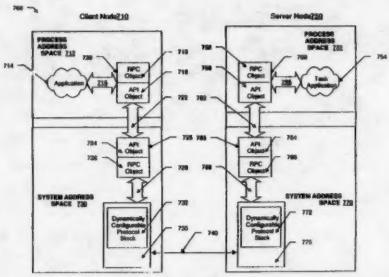
**1**. A system for implementing remote procedure call services over a computer network having a plurality of alternate communication links, each of the plurality of alternate communication links having a different network protocol, the system comprising:

(a) a client node having a source network address:

(b) a server node having a task application program executing therein to provide services;

(c) a memory in the client node with a system address space and a process address space having an application program executing therein for generating a service request;

(d) a first dynamically-configurable protocol stack in the system address space configurable for connecting the client node to



one of the plurality of alternate communication links by packaging data according to the network protocol of the one communication link:

(e) means responsive to the service request for providing a service object to the application program, the service object containing information for configuring the first dynamically-configurable protocol stack and destination network address of the task application program;

(f) means responsive to the service request for instantiating an API object in the client node, which API object establishes a stream extending from the application program in the process address space to the first dynamically-configurable protocol stack in system address space and inserts the service object into the data stream to configure the first dynamically-configurable protocol stack;

(g) means responsive to the configuration of the dynamically-configurable protocol stack for instantiating a first RPC object in the client node which creates a service request packet containing the service request, the source network address and the destination network address;

(h) a second dynamically-configurable protocol stack in the server node configured to connect the server node to the one alternate communication link by unpackaging data according to the network protocol of the one communication link: and

(i) interface means in the server node for receiving the service request packet and providing the service request packet to the task application program.

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**5,491,801**

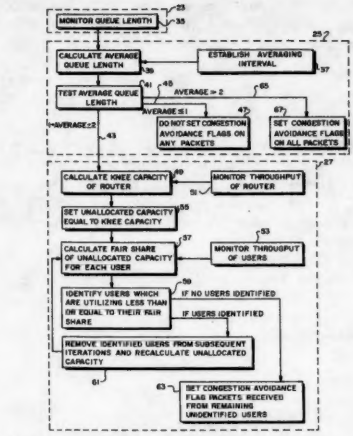
**SYSTEM FOR AVOIDING NETWORK CONGESTION BY DISTRIBUTING ROUTER RESOURCES EQUALLY AMONG USERS AND FORWARDING A FLAG TO THOSE USERS UTILIZE MORE THAN THEIR FAIR SHARE**

**Rajendra K. Jain, Sudbury; K. K. Ramakrishnan, Maynard, and Dah-Ming Chiu, Lexington, all of Mass., assignors to Digital Equipment Corporation, Maynard, Mass.**

**Continuation of Ser. No. 183,927, Jan. 21, 1994, Pat. No. 5,377,327, which is a continuation of Ser. No. 696,257, Apr. 30, 1991, abandoned, which is a continuation of Ser. No. 184,945, Apr. 22, 1988, abandoned. This application Aug. 23, 1994, Ser. No. 294,291**

**Int. Cl.[6] G06F** *13/12;13/14*

**U.S. Cl. 395—200.13** **5 Claims**



1. A system for signalling congestion status by a station on a network comprising:

a. means for receiving at said station a plurality of streams of traffic passing through said network;

b. calculation means for determining if a congestion avoidance calculation should be begun at the present time, and if the determination is to begin a congestion avoidance calculation:

calculating a fair share of unallocated capacity of said station for each user,

identifying users which are utilizing less than or equal to their fair share, and

removing identified users from subsequent iterations and recalculating unallocated capacity until no further users can be removed,

c. means for setting a congestion avoidance flag on packets received from remaining unidentified users; and

d. means for forwarding a packet having said congestion avoidance flag set.

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**5,491,802**

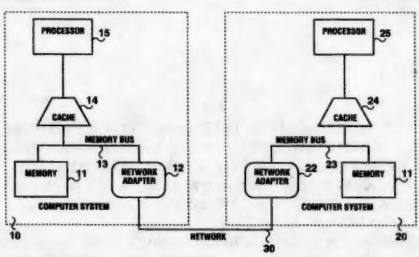
**NETWORK ADAPTER FOR INSERTING PAD BYTES INTO PACKET LINK HEADERS BASED ON DESTINATION SERVICE ACCESS POINT FIELDS FOR EFFICIENT MEMORY TRANSFER**

**Michael I. Thompson, Rocklin; Paul T. Congdon, Sacramento; John L. Burnett, Cupertino, all of Calif., and Frank Fiduccia, deceased, late of Cupertino, Calif., assignors to Hewlett-Packard Company, Palo Alto, Calif.**

**Filed May 29, 1992, Ser. No. 891,302**

**Int. Cl.[6] G06F** *5/00*

**U.S. Cl. 395—200.18** **20 Claims**



1. In a computing system connected to a network, the computing system including a network adapter connected to the network, a main processor and a main memory, wherein network packets sent across the network have headers which have internal boundaries, the boundaries being separated by a predetermined number of bytes, a method comprising the steps of:

(a) searching, by the network adapter, a network link header of a first network packet to determine a value of a destination service access point of the first network packet, the first network packet being received by the network adapter from the network;

(b) based on the value of the destination service access point, placing at least one pad byte in the network link header to cause subsequent headers in the first network packet to be aligned along the boundaries, the placing of the at least one pad byte being done by the network adapter; and,

(c) transferring the first network packet from the network adapter to the main memory.

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**5,491,803**

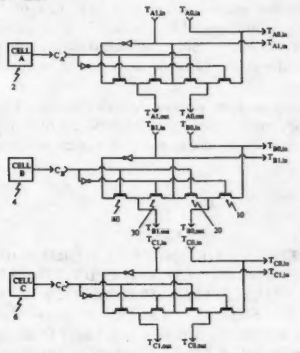
## RESPONSE RESOLVER FOR ASSOCIATIVE MEMORIES AND PARALLEL PROCESSORS

**Frederick P. Herrmann, Cambridge, and Charles G. Sodini, Belmont, both of Mass., assignors to Massachusetts Institute of Technology, Cambridge, Mass.**

**Continuation of Ser. No. 887,327, May 22, 1992, abandoned. This application May 1, 1995, Ser. No. 431,478**

**Int. Cl.**[6] **G06F** *7/00;9/00;9/46;* **H03K** *19/094*

**U.S. Cl. 395—287** **19 Claims**




**1**. A logic circuit for both prioritizing and counting responses from a plurality of cells of an array comprising:

a means for generating a first token in an initial state;

a plurality of stages wherein each stage is associated with one cell of the plurality of cells and each stage comprises

a) a first input for receiving an input token, wherein possible states of the input token include an initial state, a first toggle state, and a second toggle state,

b) a second input for receiving a response from the said cell associated with said stage,

c) a first output for sending an output token, wherein possible states of the output token include the initial state, the first toggle state, and the second toggle state,

d) a second output for sending the input token, and

e) logic means for determining the state of the output token wherein the state of the output token is the same as the state of the input token if the response from the associated cell is negative, the state of the output token may be either the first toggle state or the second toggle state if the response from the associated cell is positive and the input token is in the initial state, the state of the output token is the first toggle state if the response from the associated cell is positive and the input token is in the second toggle state, and the state of the output token is the second toggle state if the response from the associated cell is positive and the input token is in the first toggle state;

means for connecting the means for generating the first token to the first input of a first stage; and

means for connecting the first output of each stage except for a last stage to the first input of a next stage, whereby a chain of stages is formed and whereby the responses from the plurality of cells may be prioritized and counted based on the second output of each stage and the first output of the last stage.

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**5,491,804**

## METHOD AND APPARATUS FOR AUTOMATIC INITIALIZATION OF PLUGGABLE OPTION CARDS

**Chester A. Heath; John K. Langgood, both of Boca Raton, Fla., and Ronald E. Valli, Pittsburgh, Pa., assignors to International Business Machines Corp., Armonk, N.Y.**

**Continuation of Ser. No. 296,387, Jan. 6, 1989, Pat. No. 5,038,320, which is a continuation of Ser. No. 21,391, Mar. 13, 1987, abandoned. This application Jan. 4, 1991, Ser. No. 637,411**

**Int. Cl.**[6] **G06F** *13/00;7/04*

**U.S. Cl. 395—275** **48 Claims**

POST(POWER ON SELF TEST) SETUP
RESET CHANNEL
FETCH CARD ID'S IN SEQUENCE
COMPARE EACH ID VALUE WITH ID VALUE IN RESPECTIVE SLOT POSITION
ID MISMATCH: INVOKE INITIALIZATION SETUP PROGRAM
IF ALL ID'S MATCH, TRANSFER PARAMETER INFO FROM SLOT POSITIONS TO RESPECTIVE CARD REGISTERS 21

**1**. A method for operating a computer system to facilitate user transparent establishment of variable system parameters, including addressing for a first configuration of adapter cards attached to said system, wherein each card in said first configuration is of a predetermined card type and has a predefined unique card type ID value associated therewith, and further wherein said system includes a plurality of sockets into which each card in said set of adapter cards may be interchangeable plugged, nonvolatile memory means, coupled to said plurality of sockets, for storing in locations thereof, ID values and parameter information signals pertaining to each of said plurality of sockets and any card plugged into a given socket when the system is powered down, and software-adjustable parameter storage means on each card, coupled to said nonvolatile memory means, utilized in the process of automatically configuring said system on power up to support said first configuration of adapter cards, comprising the steps of:

(a) individually addressing each of said sockets;

(b) determining if a socket is vacant;

(c) terminating further operations relative to any socket determined to be vacant;

(d) conditioning each card attached to a socket to transmit its predefined card type ID value;

(e) determining if said first configuration has changed since the system was last powered down by comparing the transmitted ID value returned by each card attached to any one of said plurality of sockets with the ID value stored in the corresponding memory location in nonvolatile memory for each socket; and

(f) transferring, so long as said first configuration has not changed, the parameter information signals stored in said nonvolatile memory means pertaining to each socket and attached card, to the aforesaid parameter storage means on each card to thereby automatically configure said system.

**5,491,805**

## APPARATUS FOR AUTOMATICALLY IDENTIFYING POINT-TO-POINT CABLE INTERCONNECTIONS AMONG A PLURALITY OF COMPONENTS WHICH ARE ALSO LINKED VIA A BROADCAST CONTROL CHANNEL

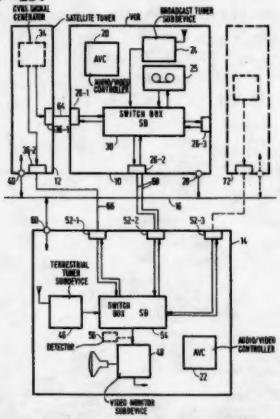
**Harm J. Welmer, Redhill, United Kingdom, assignor to D2B Systems Company Limited, Redhill, England**

**Continuation of Ser. No. 856,774, Mar. 24, 1992, abandoned. This application Dec. 20, 1994, Ser. No. 360,189**

**Claims priority, application United Kingdom, May 3, 1991, 9109609**

**Int. Cl.[6] G06F** *13/00*

**U.S. Cl. 395—284** **12 Claims**




1. A system comprising a plurality of apparatuses for processing user information and being arranged with inputs and outputs that have dedicated point-to-point interconnections for communicating such user information between said apparatuses, said apparatuses being furthermore linked by a serial control channel,

said system having cable detection means addressable via said serial control channel for automatically detecting said point-to-point interconnections through generating a sequence of a first message, a subsequence of second messages, and a third message, each said input being provided with a detector for such user information,

said first message interrupting any supply of user information to any said interconnection,

each message of said subsequence of second messages enabling the supply of user information to one interconnection unique to that message while interrupting any further supply to other interconnections and thereby activating at most one unique detector, a time-sequential detection pattern of all detectors thus identifying said interconnections,

said third message re-enabling the supply of user information to all said interconnections.

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**5,491,806**

## OPTIMIZED TRANSLATION LOOKASIDE BUFFER SLICE HAVING STORED MASK BITS

**Jens Horstmann, Sunnyvale, and Yoon Kim, Danville, both of Calif., assignors to LSI Logic Corporation, Milpitas, Calif.**

**Filed Jun. 26, 1990, Ser. No. 543,936**

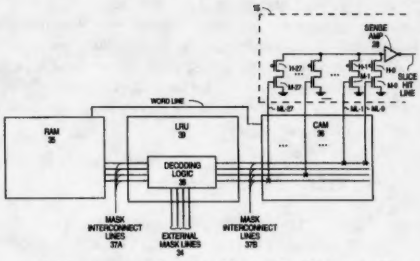
**Int. Cl.[6] G06F** *12/10*

**U.S. Cl. 395—417** **3 Claims**

1. A translation lookaside buffer comprising:

a plurality of first storage locations for storing virtual addresses, each of said virtual addresses comprising a plurality of bits;

a plurality of second storage locations, each of said second storage locations for storing a physical address corresponding to one of said virtual addresses and for storing a plurality of




mask bits corresponding to said one of said virtual addresses, there being an equal number of first and second storage locations;

comparator means connected to said plurality of first storage locations for determining whether a particular virtual address is stored within one of said plurality of first storage locations; and

masking means connected to said comparator means for masking selected individual ones of said bits of said virtual addresses stored in said first storage locations, said individual ones of said bits of said virtual addresses selected depending upon said plurality of stored mask bits in said second storage locations;

wherein said masking means is selectively controllable to simultaneously mask a first set of the bits of a first virtual address during a single virtual-to-physical address lookup.

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**5,491,807**

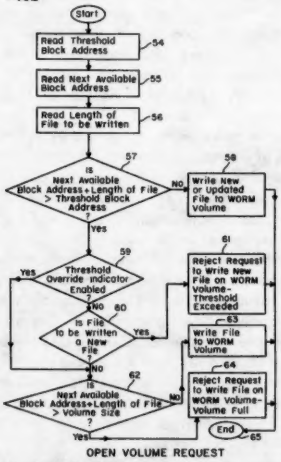
## SYSTEM AND METHOD FOR WORM VOLUME MANAGEMENT OF NEW AND UPDATED DATA FILES USING VARIABLE THRESHOLD BLOCK ADDRESSES

**Harrison L. Freeman, Kasson; William Jaaskelainen, Oronoco; Richard G. Mustain, and Larry D. Shumway, both of Rochester, all of Minn., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed Mar. 20, 1989, Ser. No. 325,752**

**Int. Cl.[6] G06F** *12/02;* **G11B** *17/22*

**U.S. Cl. 395—401** **11 Claims**




OPEN VOLUME REQUEST

1. A method of efficiently managing a write once read mostly (WORM) volume, comprising the steps of:

setting a threshold block address on said WORM volume;

determining the length of a data file to be placed on said WORM volume;

determining whether said data file is a new data file or an updated data file;

if said data file is a new data file, sequentially writing said new data file to said WORM volume only if said threshold block address is not exceeded by writing said new data file to said WORM volume; and

if said data file is an updated data file, sequentially writing said updated file to said WORM volume regardless of whether said threshold block address is exceeded unless the size of said WORM volume is exceeded.

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**5,491,808**

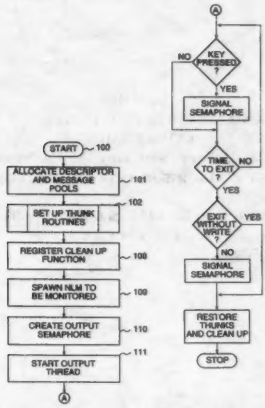
## METHOD FOR TRACKING MEMORY ALLOCATION IN NETWORK FILE SERVER

**James F. Geist, Jr., Redmond, Wash., assignor to Conner Peripherals, Inc., San Jose, Calif.**

**Filed Sep. 30, 1992, Ser. No. 954,129**

**Int. Cl.[6] G06F** *12/00;9/32*

**U.S. Cl. 395—427** **10 Claims**




**1**. A method for tracking server memory allocations and deallocations that are attempted or invoked by system calls made from one or more server resident programs running in a computer network server, where the server is operating under control of a network operating system having system memory allocation functions callable by the one or more server resident programs for making desired memory allocations and deallocation, the method comprising the steps of:

(a) allocating memory blocks for storing tracking information wherein said step (a) of allocating memory blocks includes:

(a.1) allocating a first pool of memory blocks for storing normal return information; and

(a.2) allocating a second pool of memory blocks for storing exception messages;

(b) identifying entry points for accessing the system memory allocation functions;

(c) replacing initial instructions of the system memory allocation functions that are accessed by the identified entry points with jump instructions so as to cause system calls made to those system functions to be redirected to respective tracker routines;

(d) in response to each system call whose execution is redirected to a respective tracker routine, executing instructions equivalent to the respectively replaced initial instructions of the called system memory allocation function, and then calling the remainder of the called system memory allocation function from the tracker routine to which the redirection jump was made;

(e) receiving return information from the called remainder of the system memory allocation function at the corresponding tracker routine;

(f) recording the received return information in the memory blocks allocated for storing tracking information, and

(g) returning the received return information to the server resident program that made the system call.

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**5,491,809**

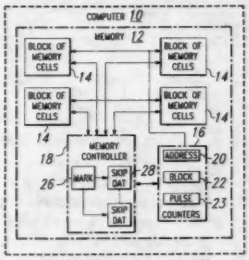
## SMART ERASE ALGORITHM WITH SECURE SCHEME FOR FLASH EPROMS

**Tim M. Coffman, Sugarland; Sung-Wei Lin, Houston, both of Tex., and T. Damodar Reddy, Nalgonda, Ind., assignors to Texas Instruments Incorporated, Dallas, Tex.**

**Filed Jan. 5, 1993, Ser. No. 764**

**Int. Cl.[6] G06F** *12/16*

**U.S. Cl. 395—430** **5 Claims**




**1**. A non-volatile memory fabricated on a silicon substrate, the memory having blocks of memory cells, means for programming the cells, means for erasing the blocks means for securing the blocks against erasure, means for detecting whether a block is in an erased state or in a state secured from erasure, and a memory controller for controlling the programming, erasing, securing, and detecting means, the memory further comprising:

(a) a mark latch for each block, each mark latch responsive to signals from the means for detecting, for generating a MARK signal indicating if its respective block has been erased, each mark latch comprising: first and second NOR gates responsive to signals from the means for detecting, the output of the first NOR gate connected to an input of the second NOR gate, and the output of the second NOR gate connected to an input of the first NOR gate; and

(b) a secure latch for each block, each secure latch responsive to signals from the means for detecting, for generating a SKIP-DAT signal indicating if its respective block has been secured against erasure, each secure latch comprising: first and second NAND gates responsive to signals from the means for detecting, the output of the first NAND gate connected to an input of the second NAND gate, and the output of the second NAND gate connected to an input of the first NAND gate.

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**5,491,810**

## METHOD AND SYSTEM FOR AUTOMATED DATA STORAGE SYSTEM SPACE ALLOCATION UTILIZING PRIORITIZED DATA SET PARAMETERS

**Stevan C. Allen, San Jose, Calif., assignor to International Business Machines Corporation, Armonk, N.Y.**

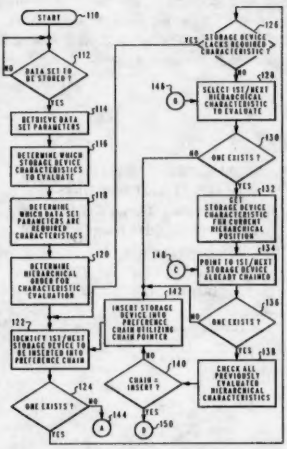
**Filed Mar. 1, 1994, Ser. No. 204,107**

**Int. Cl.[6] G06F** *12/08*

**U.S. Cl. 395—444** **12 Claims**

**1**. A method in a data processing system for automated data storage system space allocation within a data storage system having a plurality of data storage devices, said method comprising the data processing system implemented steps of:

associating a listing of characteristics representing data storage device performance and availability parameters with each of said plurality of data storage devices;


START
DATA SET TO BE STORED ?
RETRIEVE DATA SET PARAMETERS
DETERMINE WHICH STORAGE DEVICE CHARACTERISTICS TO EVALUATE
DETERMINE WHICH DATA SET PARAMETERS ARE REQUIRED CHARACTERISTICS
DETERMINE HIERARCHICAL ORDER FOR CHARACTERISTIC EVALUATION
IDENTIFY 1ST/NEXT STORAGE DEVICE TO BE INSERTED INTO PREFERENCE CHAIN
ONE EXISTS ?
STORAGE DEVICE LACKS REQUIRED CHARACTERISTIC ?
SELECT 1ST/NEXT HIERARCHICAL CHARACTERISTIC TO EVALUATE
ONE EXISTS ?
GET STORAGE DEVICE CHARACTERISTIC FOR CURRENT HIERARCHICAL POSITION
POINT TO 1ST/NEXT STORAGE DEVICE ALREADY CHAINED
ONE EXISTS ?
CHECK ALL PREVIOUSLY EVALUATED HIERARCHICAL CHARACTERISTICS
INSERT STORAGE DEVICE INTO PREFERENCE CHAIN UTILIZING CHAIN POINTER
CHAIN = INSERT ?

associating a listing of data set parameters representing selectable data storage system characteristics with each of a plurality of data sets within said data processing system;

comparing a list of data set parameters associated with a particular data set with said listing of characteristics associated with each data storage device in a specified hierarchical order in response to an attempted storage of said particular data set;

automatically storing said particular data set within a first selected one of said plurality of data storage devices in response to a determination that said first selected one of said plurality of data storage devices satisfies said entire list of data set parameters; and

automatically storing said particular data set within a second selected one of said plurality of data storage devices in response to a determination that no data storage device satisfies said entire list of data set parameters and a determination that said second selected one of said plurality of data storage devices satisfies an optimal subset of said list of data set parameters within said specified hierarchical order.

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## 5,491,811

## CACHE SYSTEM USING MASK BITS TO RECORDER THE SEQUENCES FOR TRANSFERS OF DATA THROUGH CACHE TO SYSTEM MEMORY

**Ravi K. Arimilli, Round Rock; Sudhir Dhawan, and David W. Siegel, both of Austin, all of Tex., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed Apr. 20, 1992, Ser. No. 871,322**

**Int. Cl.[6] G06F** *13/00*

**U.S. Cl. 395—471** **8 Claims**

1. Apparatus for controlling a transfer of data involving a data cache and memory of a computer system, comprising:

a bus connecting the computer system memory and the computer system data cache;

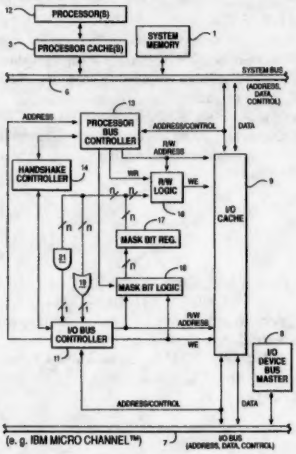
means for transferring data into the computer system data cache;

at least one data unit in the computer system data cache, the at least one data unit comprising a plurality of groups of bits;

a plurality of mask bits, wherein each of the plurality of mask bits is associated with one of the plurality of groups of bits;

means for relating a given state of each of the plurality of mask bits bit to changes in the group of bits associated with that mask bit; and

means for transferring data from the computer system memory to the computer system data cache in response to the given states of the plurality of mask bits.

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## 5,491,812

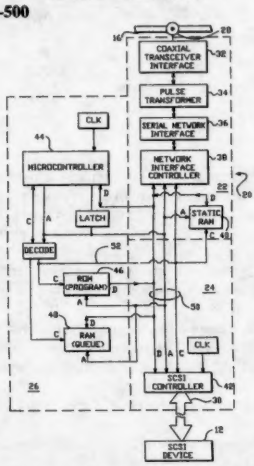
## SYSTEM AND METHOD FOR ETHERNET TO SCSI CONVERSION

**Thomas Pisello, DeBary, and Guy A. Carbonneau, Winter Springs, both of Fla., assignors to Conner Peripherals, Inc., San Jose, Calif.**

**Filed Sep. 28, 1992, Ser. No. 951,601**

**Int. Cl.[6] G06F** *13/00*

**U.S. Cl. 395—500** **6 Claims**




1. A data communication system for providing data storage and retrieval between at least one computer and at least one remote storage device, each of the computer and the remote storage device being a SCSI device utilizing a data and command exchange protocol in accordance with the small computer systems interface protocol (SCSI), said system comprising:

an Ethernet network interconnecting the at least one computer and the at least one remote storage device, the Ethernet network including packet transfer means for transferring packets containing data and commands using an Ethernet protocol;

a plurality of communication converters each coupling a respective one of the at least one computer and the at least one remote storage device to the Ethernet network for passing data and commands through the Ethernet network between the

at least one computer and the at least one remote storage device, each of said communication converters comprising:

a network interface controller for receiving Ethernet packets containing data and commands from the Ethernet network and transmitting Ethernet packets containing data and commands onto the Ethernet network;

a flow control processor coupled to the network interface controller for interpreting command packets received from the Ethernet network and for accumulating data received by the network interface controller from the Ethernet network and for formatting commands and data for transmission onto the Ethernet network by the network interface controller; and

an SCSI controller coupled to the flow control processor and linked to the respective SCSI device, said SCSI controller transferring SCSI commands from the flow control processor to the respective SCSI device and transferring SCSI data accumulated in the flow control processor to the respective SCSI device in a receive mode and transferring SCSI data to the flow control processor in a transmit mode.

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**5,491,813**

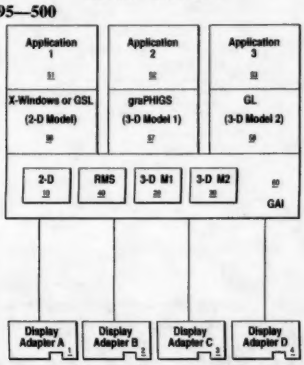
## DISPLAY SUBSYSTEM ARCHITECTURE FOR BINDING DEVICE INDEPENDENT DRIVERS TOGETHER INTO A BOUND DRIVER FOR CONTROLLING A PARTICULAR DISPLAY DEVICE

**Gregory L. Bondy; John A. Cook, and Richard L. Verburg, all of Austin, Tex., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Continuation of Ser. No. 823, Jan. 4, 1993, abandoned, which is a continuation of Ser. No. 478,384, Feb. 12, 1990, abandoned. This application Nov. 18, 1994, Ser. No. 341,858**

**Int. Cl.[6] G06F** *3/14*

**U.S. Cl. 395—500** **20 Claims**




**1**. A computer graphics system including an interface between a plurality of program applications and a plurality of dissimilar hardware display adapters, each having specific functions, comprising:

means for storing a library of resource functions including a plurality of device drivers, each device driver not corresponding to any specific individual device, but each including multiple device driver functions to control and implement different functions specific to each of said dissimilar hardware display adapters;

a plurality of device interfaces corresponding to specific functions provided by said program applications;

first means for binding specific ones of said plurality of device drivers together with one another to form a first set of bound device drivers, said first set corresponding to a first one of said dissimilar hardware display adapters, for use by a first of said program applications;

second means for binding a first one of said device interfaces, corresponding to said first dissimilar hardware display adapter, with said first set of bound device drivers and said first program application;

means for dynamically binding other specific ones of said device drivers together with one another to form a second set of bound device drivers, and a second one of said plurality of device interfaces when a second one of said dissimilar hardware display adapters is to be written to by a second one of said program applications;

means for transferring information from any one of said program applications to any one of said dissimilar hardware display adapters when a corresponding plurality of device drivers are bound with a corresponding one of said plurality of device interfaces; and

wherein said plurality of device drivers and said plurality of device interfaces are configurable to allow transfer of information from one of said program applications to any of said dissimilar hardware display adapters.

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**5,491,814**

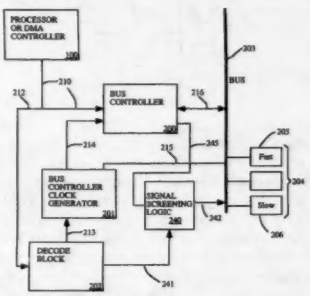
## APPARATUS USING A STATE MACHINE FOR GENERATING SELECTABLE CLOCK FREQUENCIES AND A FIXED FREQUENCY FOR OPERATING A COMPUTER BUS

**Dawson L. Yee, Beaverton, and Edward L. Solari, Monmouth, both of Oreg., assignors to Intel Corporation, Santa Clara, Calif.**

**Continuation of Ser. No. 649,604, Feb. 1, 1991, abandoned. This application Feb. 1, 1993, Ser. No. 13,146**

**Int. Cl.[6] G06F** *1/06;1/08*

**U.S. Cl. 395—550** **3 Claims**




**1**. In a computer system having a bus, peripheral devices coupled to said bus, and a processor coupled to said bus for accessing said peripheral devices, said peripheral devices including at least one slow peripheral device and at least one fast peripheral device, an apparatus for operating said bus using selectable clock frequencies, said apparatus comprising:

a bus controller coupled to said bus, said bus controller including control logic for decoding and executing bus access requests made by said processor for access to said peripheral devices, said bus controller also coupled to said processor;

a clock generator for generating clock signals of at least two different frequencies, a first clock signal for timing accesses to said slow peripheral device, a second clock signal for timing accesses to said fast peripheral device, said clock generator including a state machine for switching between said first clock signal and said second clock signal without producing glitches, said state machine receiving a frequency selection signal, said state machine generating said first clock signal by transitioning through three states if said frequency selection signal indicates a request for a slow clock, said state machine generating said second clock signal by transitioning through two states if said frequency selection signal indicates a request for a fast clock, said clock generator coupled to said bus controller, said clock generator further includes means for generating a reference clock signal on said bus concurrently

with said first and said second clock signals, said means for generating a reference clock signal coupled to said bus;

decode logic for selecting one of said clock signals, said decode logic receiving a bus access request from said processor, said decode logic generating said frequency selection signal corresponding to said bus access request, said decode logic coupled to said processor and said clock generator.

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## 5,491,815

## METHOD AND DEVICE FOR CONTROLLING TIMERS ASSOCIATED WITH MULTIPLE USERS IN A DATA PROCESSING SYSTEM

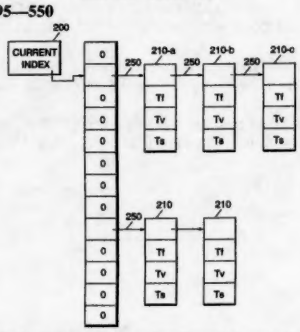
**Claude Basso, Nice; Jean Calvignac, La Gaude; Tan T. Pham, Antibes, and Charles Rheinart, Tourrettes/Loup, all of, France, assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed Sep. 10, 1993, Ser. No. 120,112**

**Claims priority, application European Pat. Off., Sep. 11, 1992, 92480130**

**Int. Cl.[6] G06F *1/04***

**U.S. Cl. 395—550** **5 Claims**




**1**. A method of controlling a plurality of timers of a number of users, each timer being associated with an event and having an associated timer control block in a data processing system having a processor and a memory wherein a user issues a START operation for a timer when an occurrence time of the associated event is awaited within a time-out period (Tv), a RESTART operation when the occurrence time of the associated event has to be delayed, and a STOP operation when the associated event has occurred, wherein each said timer control block is divided into at least a time-flag field (Tf), a time-stamp field (Ts), a time-out value field (Tv) and an address field, said method comprising the steps of:

addressing a cyclic means having a number N of storing locations which are sequentially addressed by an addressing means at regular time intervals, said cyclic means being managed by a timer control program stored in said memory and controlled by said processor, computing, in response to a START operation issued by a user according to a current time and a value in said time-out value field of said associated event, an address of said storing location in said cyclic means,

inserting said timer control block in a chain of timer control blocks associated with events which occur at the same time, said chain of timer control blocks being pointed to by a control block address stored at a computed address of a storing location in said cyclic means,

updating a flag-state field of said time-flag field (Tf) in said timer control block to a state of RUNNING to indicate that the timer is active and updating a flag-chain field of said time-flag field in said timer control block to a state of CHAINED if the timer control block is inserted for the first time in the chain, and if the timer control block is already chained, then updating the flag-state field to the state of RUNNING,

storing said value in said time-out value field (Tv) in said timer control block of the associated event, and

updating said time-stamp field (Ts) to the current time, and in response to a STOP operation, updating said flag-state field in said time-flag field of the associated timer control block to the state of "STOP", and at each regular time interval, successively reading each timer control block chained to the storing location in said cyclic means, and checking the flag-state field of the time-flag field (Tf) and

unchaining said associated timer control block if its flag-state field has the state of STOP, and

otherwise, computing a new time-out value based on the current time, the time-stamp (Ts) and the value in said time-out value field (new time-out value=time-out value+time-stamp−current time) to control, if the time-out delay has elapsed, the inserting of the timer control block into a new timer control block chain if the new time-out value is positive, or unchaining and stopping the timer control block if said new time-out value is equal to zero and notifying the user that the time-out delay has elapsed.

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## 5,491,816

## INPUT/OUPUT CONTROLLER PROVIDING PREVENTIVE MAINTENANCE INFORMATION REGARDING A SPARE I/O UNIT

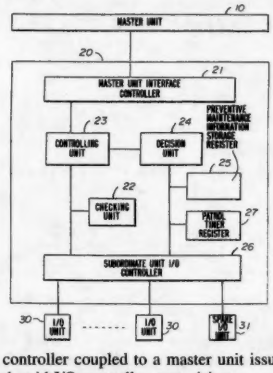
**Tatsuo Matoba, and Keiichi Yorimitsu, both of Kawasaki, Japan, assignors to Fujitsu Limited, Kawasaki, Japan**

**Continuation of Ser. No. 857,931, May 19, 1992, abandoned. This application Jan. 17, 1995, Ser. No. 373,475**

**Claims priority, application Japan, Sep. 20, 1990, 2-251053**

**Int. Cl.[6] G06F *11/20***

**U.S. Cl. 395—181** **51 Claims**




**1**. An I/O controller coupled to a master unit issuing an operation command, said I/O controller comprising:

a plurality of I/O units and a spare I/O unit;

a subordinate unit I/O controller connected to said plurality of I/O units and said spare I/O unit;

a master unit interface controller, operatively connected to said master unit and said subordinate unit I/O controller, receiving said operation command issued from said master unit and forwarding said operation command to said I/O units and said spare I/O unit;

checking means for checking a normality of data in said I/O units, based on a signal obtained by reading data and an error-detecting code concurrently from said I/O units;

controlling means for controlling at least one of said I/O units and said spare I/O unit based on said operation command input from said master interface controller via said subordinate unit I/O controller, said controlling means controlling said I/O units only, if a normality of data is found in all said I/O units by said checking means and controlling remaining normal I/O units and said spare I/O unit if an abnormality is found in any of said I/O units by said checking means, and controlling, via said subordinate unit I/O controller, one of said I/O units and said spare I/O unit, on the basis of said

operation command input from said master unit via said master unit interface controller;

decision means for deciding whether at least one of said I/O units and said spare I/O unit operate normally if said controlling means is not processing said operation command input from said master unit via said master unit interface controller; and

an information storage register temporarily storing information regarding an abnormality if an abnormality of said I/O units and said spare I/O unit is found by said decision means.

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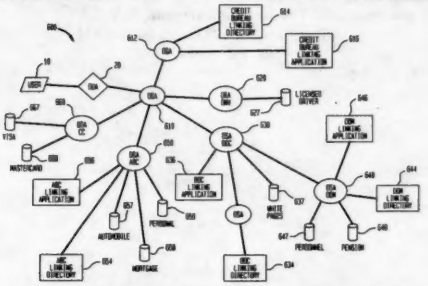
**5,491,817**

**LINKING SYSTEM AND METHOD FOR ACCESSING DIRECTORY INFORMATION ABOUT AN OBJECT IN ONE CONTEXT WHEN INFORMATION IN ANOTHER CONTEXT IS KNOWN**

**Gita Gopal, Wayne, and Sze-Ying Wuu, Branchburg, both of N.J., assignors to Bell Communications Research Inc., Livingston, N.J.**

**Filed May 25, 1993, Ser. No. 68,822**
**Int. Cl.[6] G06F** *17/30*
**U.S. Cl. 395—600** **21 Claims**



1. A method of retrieving information in a system including a network which interconnects users and local directories and employs a standard directory protocol, at least one linking application, and at least one linking directory, comprising the steps of:

receiving at a linking application input from a user which includes known information about an object in a first context and a request for information about said object in at least one particular context;

sending from said linking application a first query to one of said local directories holding said known information about said object in said first context to retrieve a linking identifier which uniquely identifies said object;

sending from said linking application a second query, which includes said linking identifier, to a linking directory to access an entry in said linking directory corresponding to said object and to retrieve linking references which point to entities containing further information regarding said object in said other context, said entities including local directories and linking applications;

retrieving from said linking directory a key corresponding to each of said entities for accessing requested information about said object;

sending a third query, which includes said corresponding key, from said linking application to each of said entities pointed to by said linking reference to retrieve requested information; and

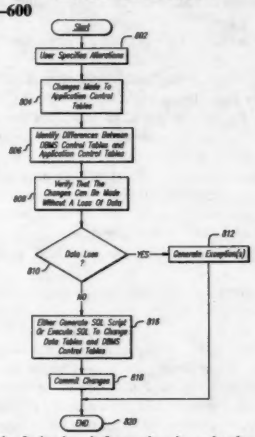
at said linking application, formatting said requested information retrieved from said entities and sending said formatted information to said user in response to said request.

**5,491,818**

**SYSTEM FOR MIGRATING APPLICATION DATA DEFINITION CATALOG CHANGES TO THE SYSTEM LEVEL DATA DEFINITION CATALOG IN A DATABASE**

**John A. Malatesta, Alamo, and Richard A. Bergquist, Danville, both of Calif., assignors to Peoplesoft, Inc., Walnut Creek, Calif.**

**Filed Aug. 13, 1993, Ser. No. 106,765**
**Int. Cl.[6] G06F** *17/30*
**U.S. Cl. 395—600** **4 Claims**




1. A method of altering information in a database management system comprising the steps of:

generating a database catalog, said database catalog containing a system-level definition of data;

generating an application catalog, said application catalog containing application-level data definition and said system-level data definition;

specifying a modification to said application catalog;

modifying said application catalog based on said modification;

comparing said system-level data definition in said application catalog to said system-level data definition in said database catalog;

modifying said database catalog to cause said database catalog to conform to said system-level data definition in said application catalog.

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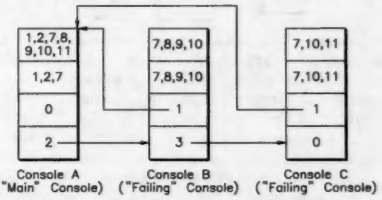
**5,491,819**

**SYSTEM AND METHOD FOR MERGING AND SEPARATING ATTRIBUTES OF CONSOLES**

**Peter A. Fatzinger, Poughkeepsie; Martin K. Leung, Wattingers Falls; Kevin Chou, Poughkeepsie, and Sockalingan Radhakrishnan, Poughkeepsie, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Continuation of Ser. No. 755,204, Sep. 5, 1991, abandoned. This application Jan. 4, 1995, Ser. No. 368,767**
**Int. Cl.[6] G06F** *17/30*
**U.S. Cl. 395—600** **21 Claims**

1. A system for performing merge transactions and non-failure



rollback transactions between data structures without logging, comprising:

(a) first and second data structure objects, each object comprising:

(i) means for storing original attributes that define that object;

(ii) means for storing apparent attributes merged into that object from the other object;

(iii) means for storing a switch-to pointer; and

(iv) means for storing a switch-chain pointer; and at least one of:

(b) merging means for processing a merge transaction, including:

(i) means for switching said switch-to pointer of said second object to point to said first object;

(ii) means for switching said switch-chain pointer of said first object to point to said second object to thereby form a switch chain; and

(iii) means for logically ORing said apparent attributes of said first and second objects to thereby render said second object idle and permit said first object to control the attributes of said second object; and

(c) rolling back means for rolling back a merge transaction, including:

(i) means for removing said second object from said switch-chain; and

(ii) means for logically ANDing said original attributes of said first object with said apparent attributes of said first object and storing the resulting group of attributes as new apparent attributes for said first object, wherein said system comprises a network of interconnected computers, and each computer comprises one of zero or more objects having one of zero or more attributes, and wherein said objects are consoles and said attributes are route codes.

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**5,491,820**

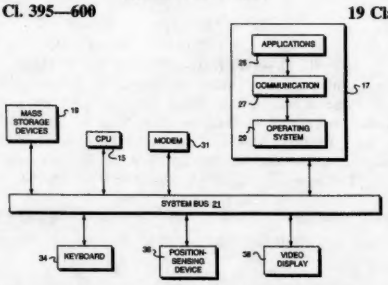
**DISTRIBUTED, INTERMITTENTLY CONNECTED, OBJECT-ORIENTED DATABASE AND MANAGEMENT SYSTEM**

**Edward Belove, Cambridge; James A. Culbert, Lynnfield; R. Patrick Johnson, Manchester, all of Mass.; David M. Heath, Nashua, N.H.; Michael F. Kraley, Lexington, Mass.; Deborah Méndez, Malden, Mass.; Sangam Pant, Winchester, Mass., and Stephen Zagieboylo, Norfolk, Mass., assignors to AT&T Corporation, Basking Ridge, N.J.**

**Filed Nov. 10, 1994, Ser. No. 337,078**

**Int. Cl.[6] G06F** *13/00*

**U.S. Cl. 395—600** **19 Claims**




1. Apparatus for facilitating selective data transfer from a central server computer to one of a plurality of client computers over a communication circuit, the apparatus comprising:

a. a database for storing a plurality of retrievable items on the server, each item comprising:

i. a header comprising an item identifier and an item title;

ii. a contents portion comprising displayable data; and

iii. at least one encapsulated procedure, the at least one encapsulated procedure including a procedure for controlling display of the displayable data;

b. a table for defining, in the database, hierarchical and linked relationships among the items stored therein, each hierarchical relationship comprising an upper-tier item and at least one lower-tier item, and each linked relationship comprising a linking item and at least one linked item;

c. resident on the server, means for retrieving requested items and providing them to clients;

d. resident on each client:

i. means for issuing to the server requests for retrievable items, at least some of the requested items being upper-tier items hierarchically related to lower-tier items;

ii. storage means for storing requested items; and

iii. a client display, responsive to the display procedures of items stored on the client, for displaying requested items;

e. a download filter template for specifying hierarchically based download and storage restrictions, on the client storage means, for at least some of the items; and

f. means for downloading requested items to the client and storing them on the client storage means in accordance with the template.

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**5,491,821**

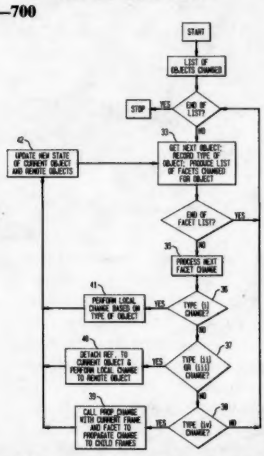
**METHOD AND SYSTEM FOR INCREMENTAL PROCESSING OF COMPUTER OBJECTS**

**Danny Kilis, Pleasanton, Calif., assignor to International Business Machines Corporation, Armonk, N.Y.**

**Filed Feb. 24, 1993, Ser. No. 21,834**

**Int. Cl.[6] G06F** *15/00*

**U.S. Cl. 395—700** **13 Claims**




1. A method of incrementally processing a source representation of a set of knowledge- or object-based objects into an intermediate representation, the objects having a previous intermediate representation, including the steps of:

(a) making a change in a source representation of a first object;

(b) transferring information identifying the change made in the source representation of the first object to a parser;

(c) running the parser on the modified source representation of the first object to check for correct syntax;

(d) preparing a list of changed facets of the first object included in the change;

(e) for a selected changed facet performing the following steps:

(i) examining characteristics of the change in order to determine effects of a change to a facet of the changed object;

(ii) if the selected changed facet affects the first object, then modify the previous intermediate representation of the first object to implement the change;

(iii) if the selected changed facet affects objects referencing or being referenced by the first object, then detach all references to the first object and modify the intermediate repre-

sentation of the objects referencing or being referenced by the first object to implement the change;

(iv) if the selected changed facet modifies an attribute of a first set of objects, propagating the change to each of the intermediate representations of the objects in the first set of objects and then recursively repeating the propagating step for each of the objects in the first set of objects until the attribute changes to each modified object have been propagated;

(f) repeating step (e) for each changed facet in the list; and

(g) performing semantic checking on each of the objects changed in step (e).

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**5,491,822**

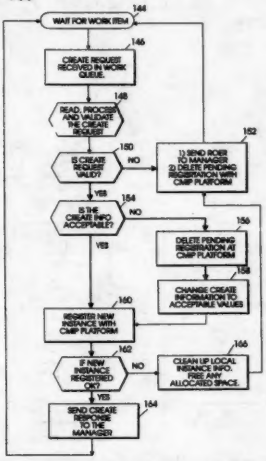
## MULTI-PHASE COMMIT PROCESSING FOR CREATION AND DELETION OF MANAGED OBJECTS

**Wade C. Allen, Durham; Jeremy P. Goodwin, Raleigh, both of N.C.; Robert L. Nielsen, Zumikon, Switzerland; Paul J. Reder, Durham, and Douglas Toltzman, Hubert, both of N.C., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed Dec. 30, 1993, Ser. No. 175,904**

**Int. Cl.[6] G06F** *19/00*

**U.S. Cl. 395—700** **15 Claims**




1. In a computing system having manager applications (manager) that manage Managed Object Instances (MOI) in agent applications (agent) running on top of a management services platform, a method for multi-phase commit processing of requests by a manager application to a agent application, the requests identifying action to be taken on a requested MOI at the agent application, said method comprising the steps of:

registering the request for the requested MOI as an action pending entry on a pending list in said platform;

sending the request to the agent to determine whether the MOI accepts or rejects the request;

determining whether the request is acceptable;

if the request is acceptable, changing the pending action entry to a final action entry for the requested MOI; and

sending a message to the requested MOI to execute the request; and

executing the request.

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**5,491,823**

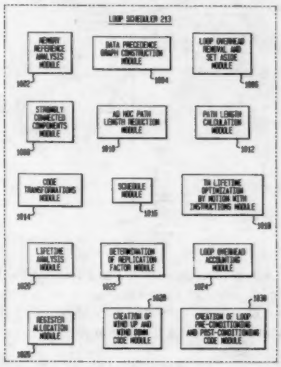
## LOOP SCHEDULER

**John C. Ruttenberg, Waban, Mass., assignor to Silicon Graphics, Inc., Mountain View, Calif.**

**Filed Jan. 25, 1994, Ser. No. 186,268**

**Int. Cl.[6] G06F** *9/45*

**U.S. Cl. 395—700** **16 Claims**




1. A method of generating a schedule for executing in a target computer loops of instructions contained in a computer program, comprising the steps of:

(1) searching for an optimal loop schedule for executing a particular instruction loop in the target computer;

(2) identifying loop overhead instructions and non-loop overhead instructions in said particular instruction loop;

(3) generating a replicated loop schedule by replicating said non-loop overhead instructions in said loop schedule by a replication factor such that overlap of each operation instance in said optimal loop schedule with itself is prevented;

(4) inserting said loop overhead instructions into said replicated loop schedule to generate a modified loop schedule; and

(5) allocating registers of the target computer to said modified loop schedule.

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**5,491,824**

## SYSTEM AND METHOD FOR IMPROVED EFFICIENCY AND DEADLOCK PREVENTION IN COMMUNICATION INTERFACES UTILIZING A FIRST-IN-FIRST-OUT ACTION QUEUE

**Enathickal J. Koshi, Tucson, Ariz., assignor to International Business Machines Corporation, Armonk, N.Y.**

**Continuation of Ser. No. 871,865, Apr. 20, 1992, abandoned. This application Dec. 22, 1994, Ser. No. 363,567**

**Int. Cl.[6] G06F** *13/14*

**U.S. Cl. 395—732** **7 Claims**

1. A method of operating a data communication interface between a host data processing system and a plurality of data communication channels, the data communication interface having a processor and a plurality of communication controllers, each associated with one of the plurality of communication channels, the method comprising the steps executed by the data communication interface of:

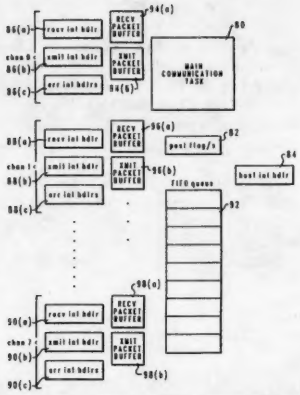
posting actions in response to requests from the host data processing system and a plurality of communication controllers;

monitoring for posting of actions;

responsive to detection of posting of an action, determining if an action was posted in response to a request by the host data processing system;

determining if the action can be executed if the action was posted in response to a request by the host data processing system;

if the determination of the last step is affirmative, executing the action;




if the action was posted in response to a request by the host data processing but was not executable, or if the action was posted in response to a request by one of said plurality of communication controllers, adding the action to an input of a First-In-First-Out queue;

examining only a first action in said First-In-First-Out queue to determine if said first action can be executed;

if the first action can be executed, executing the first action and replacing it as first action with a next action from said First-In-First-Out queue, if any; and

if the first action cannot be executed, moving the first action to said input of said First-In-First-Out queue and replacing it as first action with a next action from said First-In-First-Out queue, if any.

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**5,491,825**

## MICROPROCESSOR HAVING A FUNCTIONALLY MULTIPLEXED INPUT AND OUTPUT TERMINAL

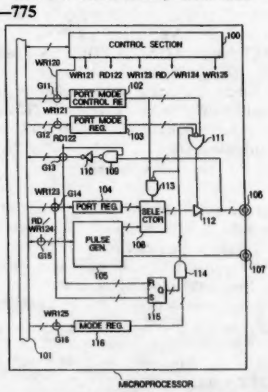
**Hajime Sakuma, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan**

**Filed May 3, 1993, Ser. No. 56,184**

**Claims priority, application Japan, May 12, 1992, 4-146686**

**Int. Cl.[6] G06F** *12/00;* **G11C** *8/00*

**U.S. Cl. 395—775** **15 Claims**




**1**. A microprocessor having a functionally multiplexed terminal, comprising:

a terminal selectively operable in a plurality of port modes for functioning as a port terminal in a first port mode and a pulse circuit terminal in a second port mode;

a port mode control register for storing data designating port mode of said terminal and outputting a mode selection signal;

a port register for holding data to be output externally;

a pulse circuit for outputting a pulse signal;

selector means coupled to the terminal, the port register, and the pulse circuit, for, in response to an output from the port mode control register, selecting a port mode of said terminal based on said mode selection signal and supplying the output of said port register when said first mode is selected and supplying the output of said pulse circuit when said second mode is selected;

switching means for forcing said terminal to said first mode to supply the output from said port register regardless of the output from said port mode control register, said switching means being coupled to said selector means and being activated by a write command signal for writing data in said port register; and

enabling means, coupled to said switching means, for enabling and disabling said switching means.

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**5,491,826**

## MICROPROCESSOR HAVING REGISTER BANK AND USING A GENERAL PURPOSE REGISTER AS A STACK POINTER

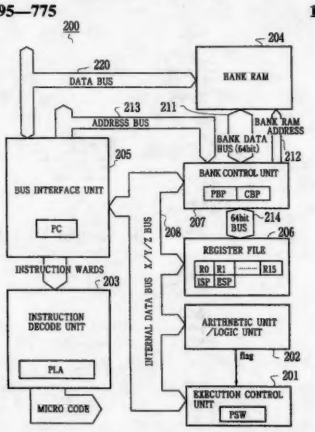
**Seiji Koino, Futyu, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan**

**Filed May 28, 1993, Ser. No. 68,104**

**Claims priority, application Japan, Jun. 1, 1992, 4-140404**

**Int. Cl.[6] G06F** *13/00*

**U.S. Cl. 395—775** **10 Claims**




**1**. In a microprocessor having a register bank, and execution means for executing an instruction, register file means for storing data for a task, the register file means comprising:

stack pointer means for storing an address for the task;

general purpose register means comprising a plurality of registers for storing data used by the execution means;

special purpose register means for storing data relating to the task, the special purpose register means comprising a current bank pointer, a processor status word including a stack pointer size field indicating a bit width of the stack pointer, a preceding bank pointer, and a program counter; and

bank ram means comprising a plurality of bank blocks, each bank block comprising a predetermined number of unit banks, and each bank block being for storing the data from the general purpose register means,

wherein, when a current task is switched to another task, said stack pointer means of the current task is set as one of the registers in said general purpose register means, and

wherein a bit width of said stack pointer means can be changed according to the contents of the stack pointer size field of the processor status word.

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**5,491,827**

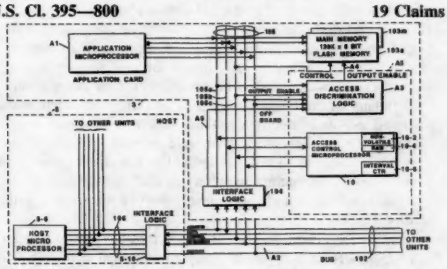
## SECURE APPLICATION CARD FOR SHARING APPLICATION DATA AND PROCEDURES AMONG A PLURALITY OF MICROPROCESSORS

**Thomas O. Holtey, Newton, Mass., assignor to Bull HN Information Systems Inc., Billerica, Mass.**

**Filed Jan. 14, 1994, Ser. No. 181,684**

**Int. Cl.[6] G06F** *15/20*

**U.S. Cl. 395—800** **19 Claims**




**1**. An application card for use in conjunction with a host microprocessor coupled through a bus interface, said application card comprising:

interface logic circuit means operatively coupled to said bus interface, said interface logic circuit means being coupled to transmit and receive requests including address, data and control information to and from said host microprocessor;

an internal bus connected to said interface logic circuit means, said internal bus having address, data and control sections for transferring said requests including signals from said interface logic circuit means for each memory request specifying which microprocessor is making said each memory request and type of memory access being made;

an access control microprocessor connected to said internal bus, said microprocessor including

an addressable non-volatile memory for storing configuration information including non-volatile memory mapping information coded for executing a specific application;

at least one non-volatile addressable memory being connected to said internal bus in common with said access control microprocessor for receiving said address, data and control information, said non-volatile memory organized into a number of blocks for storing different access type information required for executing said specific application;

access discrimination logic unit coupled to said address, data and control sections of said internal bus and to said non-volatile memory, said access discrimination logic unit storing access by type information corresponding to said non-volatile memory mapping information for said number of blocks coded for specifying different types of memory access to be made to each block by each microprocessor involved in executing said specific application and said unit in response to a memory request, reading out said access by type information of one of said blocks designated by said address information of said memory request for enabling access to said block by said microprocessor making said memory request only as specified by said access by type information.

**5,491,828**

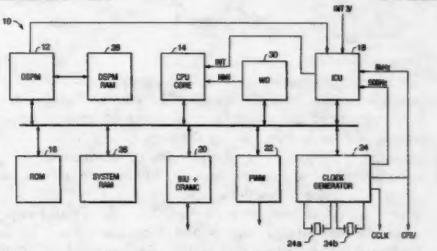
## INTEGRATED DATA PROCESSING SYSTEM HAVING CPU CORE AND PARALLEL INDEPENDENTLY OPERATING DSP MODULE UTILIZING SUCCESSIVE APPROXIMATION ANALOG TO DIGITAL AND PWM FOR PARALLEL DISCONNECT

**Gideon Intrater, Tel-Aviv; Oved Oz, Cfar Saba, and Yachin Afek, Cfar Saba, all of, Israel, assignors to National Semiconductor Corporation, Santa Clara, Calif.**

**Continuation of Ser. No. 75,175, Jun. 10, 1993, abandoned, which is a division of Ser. No. 806,082, Dec. 6, 1991, abandoned. This application Sep. 16, 1994, Ser. No. 307,399**

**Int. Cl.[6] G06F** *11/00;15/16*

**U.S. Cl. 395—800** **1 Claim**




**1**. An integrated circuit structure for use in identifying a parallel disconnect signal provided on an analog transmission medium, the integrated circuit structure comprising,

a central processing unit that executes instructions to perform data processing operations, the data processing operations including a successive approximation analog-to-digital conversion operation to provide a digital output signal based upon an input data signal;

a pulse width modulation (PWM) element that converts the digital output signal generated by the central processing unit to a square-wave output signal having a duty cycle corresponding to the digital output signal, the PWM element adapted for connection to an external low pass filter that is not formed as part of the integrated circuit structure such that the square-wave output signal is provided as an input to the external low pass filter, the external low pass filter providing an output signal corresponding to the duty cycle of the square-wave output signal; and

an input port adapted for connection to an output of an external comparator that is not formed as part of the integrated circuit structure, the external comparator receiving as inputs the output of the external low pass filter and the parallel disconnect signal provided by the analog transmission medium and providing said external comparator output a digital signal corresponding to a difference between the output of the external low pass filter and the signal provided by the analog transmission medium, the input port connected to provide the output of the comparator as the input data signal to the central processing unit.

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**5,491,829**

## METHOD AND SYSTEM FOR INDEXING THE ASSIGNMENT OF INTERMEDIATE STORAGE BUFFERS IN A SUPERSCALAR PROCESSOR SYSTEM

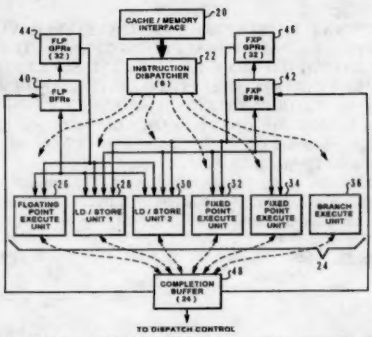
**Chin-Cheng Kau, Austin; Aubrey D. Ogden, and Donald E. Waldecker, both of Round Rock, all of Tex., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Continuation of Ser. No. 1,872, Jan. 8, 1993, abandoned. This application May 11, 1995, Ser. No. 438,819**

**Int. Cl.[6] G06F** *9/28*

**U.S. Cl. 395—800** **6 Claims**

**1**. A method for enhanced instruction dispatch efficiency in a superscalar processor system capable of simultaneously dispatching multiple scalar instructions from a dispatch buffer to a plurality of execution units during a single cycle, each of said multiple




scalar instructions including at least one source operand and one destination operand, wherein results of execution of said multiple scalar instructions are stored in a plurality of general purpose registers, said method comprising the steps of:

assigning a particular one of a plurality of intermediate storage buffers to a destination operand within each one of said multiple scalar instructions;

storing a relationship between each one of said plurality of intermediate storage buffers and a designated one of said plurality of general purpose registers in a storage buffer index;

temporarily storing results of execution of each one of said multiple scalar instructions in an assigned one of said plurality of intermediate storage buffers; and

transferring said results of execution from a particular one of said plurality of intermediate storage buffers to an alternate one of said plurality of execution units for utilization in execution of an alternate one of said multiple scalar instructions utilizing said storage buffer index prior to a transfer of said results of execution from said particular one of said plurality of intermediate storage buffers to said designated one of said plurality of general purpose registers.

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**5,491,830**

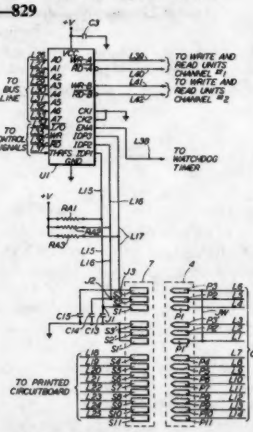
## AUTOMATIC SLOT IDENTIFICATION AND ADDRESS DECODER ARRANGEMENT

**Vincent Ferri, Pittsburgh, Pa., assignor to Westinghouse Air Brake Company, Wilmerding, Pa.**

**Continuation of Ser. No. 880,867, May 11, 1992, abandoned. This application Jan. 31, 1995, Ser. No. 384,471**

**Int. Cl.[6] G06F** *13/20*

**U.S. Cl. 395—829** **20 Claims**


TO BUS LINE
TO CONTROL SIGNALS
TO WRITE AND READ UNITS CHANNEL #1
TO WRITE AND READ UNITS CHANNEL #2
TO WATCHDOG TIMER
TO PRINTED CIRCUITBOARD
TO CABLE 2

1. An automatic computer slot identification and address decoder arrangement for a computer having a central processor unit, and a motherboard communicating with such central processor unit, such motherboard having a bus of such computer thereon, such bus having a first group of electrical conductors for conveying each of address information, control signals and data, such control signals including signals for reading and signals for writing, such bus having a plurality of in-line connectors, each of such in-line connectors being adapted to receive a printed circuit card, and make multiple electrical connections to a second group of electrical conductors on such printed circuit card, such printed circuit card being connected to an external electrical cable which is connected to external equipment, said automatic computer slot recognition and address decoder arrangement comprising:

(a) a third group of electrical conductors disposed on such printed circuit card;

(b) a first multiple contact connector means disposed on such printed circuit card for connecting to such external electrical cable, a plurality of contacts of said first multiple contact connector means being connected to corresponding members of said third group of electrical conductors;

(c) a second multiple contact connector means disposed on such external electrical cable having a fourth group of electrical conductors, a plurality of contacts of said second multiple contact connector means being connected to corresponding members of said fourth group of electrical conductors disposed on such electrical cable, said first multiple contact connector means mating with said second multiple contact connector means to provide individual electrical connections between corresponding members of said third group of electrical conductors and said fourth group of electrical conductors;

(d) means for connecting shunt conductors between a plurality of members of said fourth group of electrical conductors for establishing an electrical configuration indicative of address information for such computer card to which such cable is attached;

(e) means disposed on each of such printed circuit cards for applying electrical voltages to a plurality of members of said third group of electrical conductors whereby voltages are applied through contacts of said first multiple contact connector means and contacts of said second multiple contact connector means to a plurality of members of said fourth group of electrical conductors to sense said electrical configuration indicative of address information;

(f) means disposed on each of such printed circuit cards for determining an address for reading and an address for writing, based on said electrical configuration;

(g) means disposed on each of such printed circuit cards for decoding address information from such motherboard, and responding to address signals indicative of said address for reading and said address for writing; and

(h) means responsive to control signals received from such computer bus for placing a plurality of members of such first group of conductors on such computer bus in communication with a corresponding plurality of said fourth group of conductors on such electrical cable to external equipment.

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**5,491,831**

## CELLULAR MOTOR CONTROL NETWORK

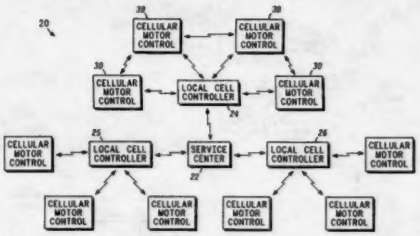
**Gregory L. Williams, Scottsdale, and William C. Roman, Tempe, both of Ariz., assignors to Motorola, Schaumburg, Ill.**

**Filed May 10, 1993, Ser. No. 59,555**

**Int. Cl.[6] H04B** *7/00*

**U.S. Cl. 455—33.1** **25 Claims**

18. A cellular motor control network comprising a plurality of variable speed electric motors each having a cellular motor control coupled thereto, each of the cellular motor controls including control means for controlling the operation of the variable speed electric motor, a microprocessor coupled to the control means for providing a predetermined control program, and a wireless transmitter/receiver coupled to the microprocessor for communi-




cating information between the microprocessor and remotely located control units; and

the remotely located control units each including a local cell controller located remotely from at least some of the plurality of cellular motor controls, the local cell controller including a cell controller wireless transmitter/receiver to the at least some of the plurality of cellular motor controls and for receiving data signals from the at least some of the plurality of cellular motor controls and a cell controller microprocessor coupled to the cell controller wireless transmitter/receiver for supplying the control signals to the cell controller wireless transmitter/receiver and receiving the data signals from the cell controller wireless transmitter/receiver.

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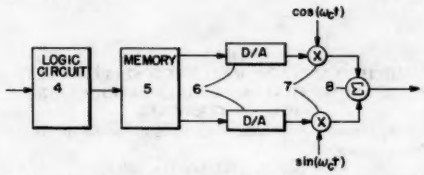
**5,491,832**

## CELLULAR RADIO COMMUNICATIONS SYSTEM

**Esa Malkamaki, Espoo, and Harri Jokinen, Hiisi, both of, Finland, assignors to Nokia Mobile Phones Ltd., Salo, Finland**

**Continuation of Ser. No. 946,529, Sep. 16, 1992, abandoned. This application Nov. 8, 1994, Ser. No. 336,018**
**Claims priority, application Finland, Sep. 17, 1991, 914369**
**Int. Cl.[6] H04B** *1/04;* **H03C** *5/00*
**U.S. Cl. 455—33.1** **2 Claims**




1. A quadrature modulator circuit for cellular radio communications systems for use in both large and small area cell regions comprising:

a first filter circuit having an input and an output and responsive to an encoded signal applied to said input thereof for providing a first filtered encoded output signal;

a second filter circuit having an input and an output and responsive to an encoded signal applied to said input thereof for providing a second filtered encoded output signal,

a first multiplier circuit having a first input connected to the output of said first filter circuit and responsive to a cos ($w_c t$) modulating signal for selectively modulating the first filtered encoded output signal from said first filter circuit to selectively provide a cosine component of a binary offset quadrature amplitude first linear modulated signal for use exclusively in small cell areas and a cosine component of a non-linear constant envelope differential encoded GMSK modulated signal for use exclusively in large cell areas,

a second multiplier circuit connected to the output of said second filter circuit and responsive to a $\sin(w_c t)$ modulating signal for selectively modulating the second filtered encoded output signal from said second filter circuit to provide a sine component of said non-linear constant envelope differentially encoded GMSK modulated signal for use exclusively in large cell areas and a sine component of said binary offset first linear modulated signal for use exclusively in small cell areas,

and an adder circuit connected to said first and second multiplier circuits for adding said cosine and sine component signals from said multiplier circuits for selectively providing an output signal consisting of said linear modulated output signal exclusively for small cell areas and of said non-linear modulated signal exclusively for large cell areas.

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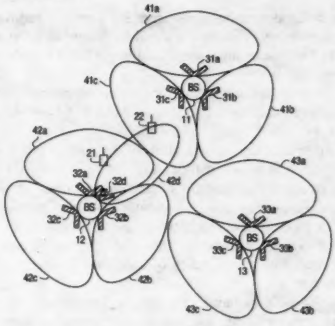
**5,491,833**

## MOBILE RADIO COMMUNICATION SYSTEM HAVING RADIO ZONES OF SECTOR CONFIGURATIONS AND ANTENNA SELECTING METHOD EMPLOYED THEREIN

**Kojiro Hamabe, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan**

**Filed Dec. 20, 1994, Ser. No. 359,898**
**Claims priority, application Japan, Dec. 27, 1993, 5-330207**
**Int. Cl.[6] H04Q** *7/00*
**U.S. Cl. 455—33.1** **8 Claims**




1. A mobile radio communication system, comprising:

a plurality of radio zones, each radio zone having disposed therein a radio base station including a receiving means and an antenna selecting means;

a plurality of normal sector cells formed in said each radio zone by dividing said each radio zone so as to cover transmission and reception of a radio wave;

at least one narrow sector cell provided so as to overlap at least two normal sector cells;

a plurality of antennas disposed in said each radio zone and connected to the receiving means of the radio base station disposed in said each radio zone, said antennas generating horizontal plane directional radiation patterns corresponding to said plurality of normal sector cells and said at least one narrow sector cell in said each radio zone; and

a plurality of radio terminals located within said radio zones, for communicating with the radio base station with a radio channel assigned from a plurality of radio channels as a communication channel;

wherein each antenna selecting means, in response to a communication request from one of said radio terminals, selects an antenna among said plurality of antennas having a sum which is maximum, said sum being determined as an added result of a value expressed in decibels of received power of a desired radio wave and a constant predetermined for each antenna according to a half-power beam width of the horizontal plane directional radiation pattern generated by said each antenna.

## 5,491,834
## MOBILE RADIO HANDOVER INITIATION DETERMINATION

**Si Tak S. Chia, Suffolk, England, assignor to British Telecommunications public limited company, London, England**

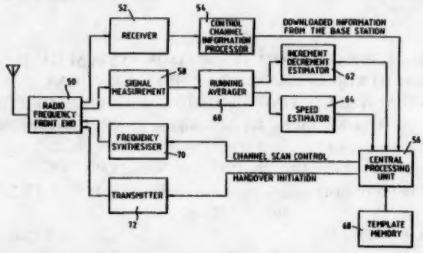
**PCT No. PCT/GB91/02290, § 371 Date Aug. 27, 1993, § 102(e) Date Aug. 27, 1993, PCT Pub. No. WO92/12602, PCT Pub. Date Jul. 23, 1992**

**PCT Filed Dec. 20, 1991, Ser. No. 81,291**

**Claims priority, application United Kingdom, Dec. 27, 1990, 9028108**

**Int. Cl.[6] H04Q 7/22**

**U.S. Cl. 455—33.2** **20 Claims**




1. A handover determination system for a mobile radio network including a plurality of cells, each cell having associated with it a base station for supporting communications with a mobile unit, the system comprising:

means for monitoring a quality of a signal respectively transmitted between each of a plurality of candidate base stations and the mobile unit;

means for producing an indication of the rise or fall in the said quality as a function of time; and

control means for initiating a handover from a serving base station, supporting communications with the mobile unit, to another base station, the initiation being based on the rise/fall as a function of time in the said quality of the signals associated with the plurality of candidate base stations being monitored;

said mobile unit including the means for monitoring and the means for producing, the mobile unit further comprising signalling means for addressing the serving base station with an indication of the need for a handover to be initiated; and

said signalling means being arranged to address the serving base station with an indication of the level of priority of a handover and/or with an indication of the possibility of a handover contingent upon the proceeding results of monitoring the quality of the transmitted signal.

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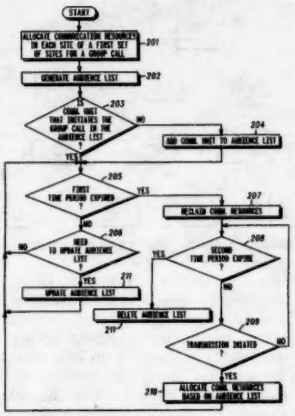
## 5,491,835
## METHOD FOR MAINTAINING AUDIENCE CONTINUITY OF A COMMUNICATION GROUP CALL

**Michael D. Sasuta, Mundelein, and John A. Wolfe, Elgin, both of Ill., assignors to Motorola, Inc., Schaumburg, Ill.**

**Filed Feb. 18, 1994, Ser. No. 198,932**

**Int. Cl.[6] H04Q 7/28**

**U.S. Cl. 455—34.1** **11 Claims**




1. A method for maintaining audience continuity of a communication group call, the method comprises the steps of:

a) allocating a communication resource in each site of a first set of sites to establish a communication group call for a particular communication group;

b) generating an audience list to include identity of at least two communication units of the particular communication group and site location of the at least two communication units;

c) modifying the audience list with a new site location for one of the at least two communication units when the one of the at least two communication units relocates into a new site that is not within the first set of sites;

d) modifying the audience list with an identity of another communication unit and a site location for the another communication unit when the another communication unit initiates a transmit operation;

e) reclaiming the each communication resource in each site of the first set of sites when another transmit operation is not initiated by a member of the particular communication group before a first time period expires; and

f) allocating a communication resource in each site that is identified as the site location for a communication unit in the audience list when a member of the particular communication group initiates the another transmit operation after the first time period has elapsed but prior to expiration of a second time period, such that, for the duration of the second time period, audience continuity is maintained for the particular communication group.

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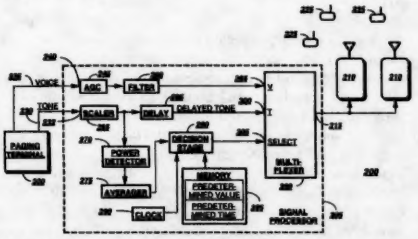
## 5,491,836
## METHOD AND APPARATUS FOR SELECTIVELY SQUELCHING ANALOG SIGNALS PRODUCED BY A PAGING TERMINAL

**David A. Neiss, Fort Worth, Tex., assignor to Motorola, Inc., Schaumburg, Ill.**

**Filed Dec. 2, 1993, Ser. No. 160,131**

**Int. Cl.[6] H04Q 3/02**

**U.S. Cl. 455—38.5** **18 Claims**




1. A method for producing analog signals at an analog output in a communication system, the method comprising the steps of:

receiving tone signals on tone lines during a first plurality of time periods;

receiving voice signals on voice lines during a second plurality of time periods;

detecting power levels of any signal on the tone lines;

averaging the power levels to provide an average value;

deciding that the tone signals are present on the tone lines when the average value exceeds a predetermined value for a predetermined amount of time;

coupling the tone signals to the analog output when the tone signals are present on the tone lines;

coupling the voice signals to the analog output when the tone signals are not present on the tone lines; and

coupling the analog output to a transmitter for transmitting the tone and voice signals provided thereto as a radio frequency (RF) signal.

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**5,491,837**

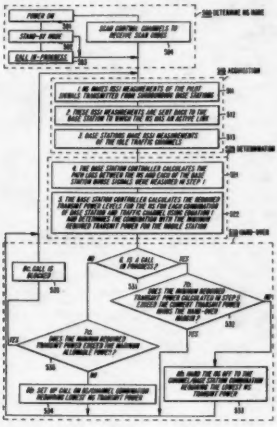
## METHOD AND SYSTEM FOR CHANNEL ALLOCATION USING POWER CONTROL AND MOBILE-ASSISTED HANDOVER MEASUREMENTS

**Jacobus C. Haartsen, Staffanstorp, Sweden, assignor to Ericsson Inc., Research Triangle Park, N.C.**

**Filed Mar. 7, 1994, Ser. No. 207,032**

**Int. Cl.[6] H04B** *15/00*

**U.S. Cl. 455—62** **32 Claims**



1. A method for assigning uplink radio channels in a radio communication system comprising the steps of:

(a) measuring, in a mobile station, received signal strength indications (RSSIs) of control signals broadcast from at least one base station;

(b) determining a path loss between the mobile station and the at least one base station using the RSSI measurements;

(c) measuring, in the at least one base station, an RSSI of interference signals on a plurality of available traffic channels;

(d) determining transmit powers required for the mobile station to produce a signal on each of the plurality of available traffic channels at the at least one base station, wherein a strength of said signal is a predetermined level above a corresponding RSSI interference level measured on a traffic channel taking into consideration the path loss; and

(e) assigning one of said plurality of available traffic channels as an uplink channel based on said determined transmit powers.

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**5,491,838**

## BROADCAST SYSTEM WITH ASSOCIATED DATA CAPABILITIES

**Tsutomu Takahisa, Sunnyvale, Calif.; Motohisa Iida, Shizuoka, Japan, and Lucille Allen, Woodbridge, Va., assignors to Digital D.J. Inc., San Jose, Calif.**

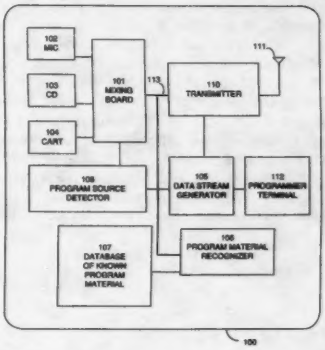
**Filed Apr. 8, 1993, Ser. No. 45,352**

**Int. Cl.[6] H04B** *7/00*

**U.S. Cl. 455—66** **4 Claims**

1. A system for simultaneously transmitting program material and data corresponding to the program material, comprising:

a plurality of program sources;




a transmitter;

a mixing board for routing said program material from a selected one of said program sources to said transmitter by selectively switching among said program sources and providing as an output signal said program material from said selected program source;

program source detection means coupled to said mixing board for providing a program source signal corresponding to said selected program source;

program material recognition means, coupled to said mixing board output signal, for comparing said program material with a database of known program material data and generating a program material identifying signal in response to the results of said comparison; and

a data stream generator, coupled to said program recognition means, to said program source detection means and to said transmitter, for applying a data stream to said transmitter for transmission with the program material responsive to said program material identifying signal and said program source signal.

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**5,491,839**

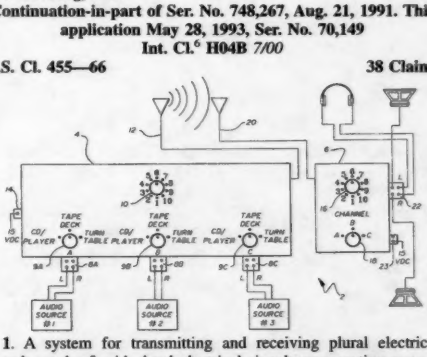
## SYSTEM FOR SHORT RANGE TRANSMISSION OF A PLURALITY OF SIGNALS SIMULTANEOUSLY OVER THE AIR USING HIGH FREQUENCY CARRIERS

**Larry Schotz, Mequon, Wis., assignor to L. S. Research, Inc., Cedarburg, Wis.**

**Continuation-in-part of Ser. No. 748,267, Aug. 21, 1991. This application May 28, 1993, Ser. No. 70,149**

**Int. Cl.[6] H04B** *7/00*

**U.S. Cl. 455—66** **38 Claims**




1. A system for transmitting and receiving plural electrical signals, each of said plural electrical signals representing respective electrical input signals provided from at least respective first and second high fidelity audio sources to said system, said system comprising:

(a) transmitter means comprising:

(1) input means for receiving said plural electrical signals;

(2) selectable sinusoidal carrier signal producing means for selectably providing at least a first group of sinusoidal

carrier signals from plural groups of plural sinusoidal carrier signals, each of said groups comprising at least a first carrier signal and a second carrier signal, said first carrier signal of each of said groups being associated with said first audio source, said second carrier signal of each of said groups being associated with said second audio source, each of said sinusoidal carrier signals of each of said group being preselected and different from the others of said groups and at a frequency of at least 900 MHz, said selectable sinusoidal carrier signal producing means comprising a set of frequency synthesizer means, one respective frequency synthesizer means for each of said electrical input signals, said frequency synthesizer means generating said different sinusoidal carrier signals of said frequency of at least 900 MHz;

(3) modulating means for modulating each of said carrier signals of said first group with a respective one of said plural electrical signals to produce a plurality of modulated carrier signals;

(4) combining means for combining said modulated carrier signals into a combined signal;

(5) antenna means for radiating said combined signal over the air; and

(b) receiver means for receiving said combined signal.

# DESIGN PATENTS

## GRANTED FEB. 13, 1996

### ERRATA

| For CLASS | See PATENT NO. |
|---|---|
| D15\146 | D366995 |

# DESIGNS

FEBRUARY 13, 1996

366,951

SPORT SHOE

Katey Ho, Los Angeles, Calif., assignor to Eurostar, Inc., Los Angeles, Calif.

Filed Dec. 19, 1994, Ser. No. 32,447

Term of patent 14 years

U.S. Cl. D2—907

366,952

SHOE OUTSOLE AND UPPER

Clifford L. Pyle, Cincinnati, Ohio, assignor to Nine West Group, Stamford, Conn.

Filed Apr. 12, 1994, Ser. No. 21,736

Term of patent 14 years

U.S. Cl. D2—908

366,953

SAFETY SHOE

Robert J. Tate, 116 Horneytown Rd., High Point, N.C. 27265

Filed Feb. 10, 1994, Ser. No. 18,567

Term of patent 14 years

U.S. Cl. D2—909

366,954

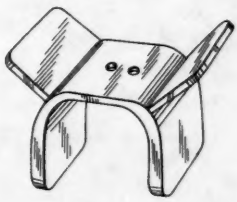
ARTICLE CARRIER ATTACHABLE TO FOOTWEAR

Alan J. Solo, 1835 Burnett St., Brooklyn, N.Y. 11229

Filed Nov. 4, 1994, Ser. No. 30,695

Term of patent 14 years

U.S. Cl. D2—946



366,955

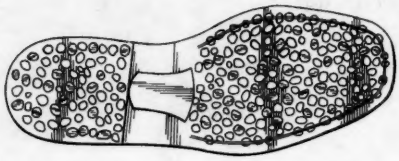
SHOE SOLE

Diego D. Valle, Via Fratte 4396, S.Elpidio a Mare, Italy

Filed Oct. 18, 1993, Ser. No. 14,250

Term of patent 14 years

U.S. Cl. D2—954



366,956

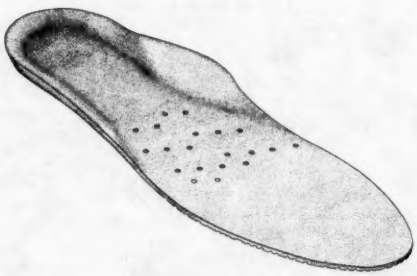
WORK BOOT INSOLE

Kenneth M. Gay, Bartlett, Tenn., assignor to Schering-Plough HealthCare Products, Inc., Memphis, Tenn.

Filed Dec. 21, 1994, Ser. No. 32,539

Term of patent 14 years

U.S. Cl. D2—961



366,957

PAGER HOLSTER

William J. Scheid, Coral Springs, and Melvin Teitzman, Lantana, both of Fla., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Nov. 21, 1994, Ser. No. 31,304

Term of patent 14 years

U.S. Cl. D3—218

366,958

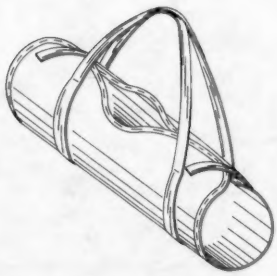
ADJUSTABLE ARTICLE HOLDER AND CARRIER

Charles O. Harr, 302 N. Fuller, Tyler, Tex. 75702

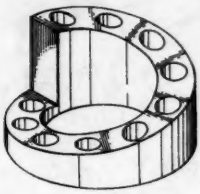
Filed Oct. 29, 1993, Ser. No. 14,823

Term of patent 14 years

U.S. Cl. D3—259



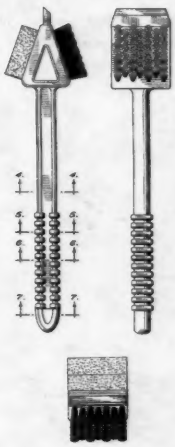
366,959
GOLF CLUB SEPARATOR
Samuel Pappalardo, R.D. #1, Box 232A, Magnolia Ave., Victory Lakes, Williamstown, N.J. 08094
Filed Mar. 18, 1994, Ser. No. 20,082
Term of patent 14 years
U.S. Cl. D3—320



366,960
TOOTHBRUSH
Salvatore V. Crimi, San Marcos Mobile Estates, 1145 Barham Dr., #121, San Marcos, Calif. 92069
Filed Jul. 31, 1995, Ser. No. 42,076
Term of patent 14 years
U.S. Cl. D4—104

366,961
TOOTHBRUSH HANDLE WITH STAND
Bertrand Barre, Dommartin, France, assignor to Chesebrough-Pond's USA Co., Division of Conopco, Inc., Greenwich, Conn.
Filed Oct. 21, 1993, Ser. No. 14,492
Claims priority, application France, Apr. 22, 1993, 932178
Term of patent 14 years
U.S. Cl. D4—108

366,962
COMBINED SCRUBBER AND SCRAPER
W. Michael Whitaker, Asheboro, N.C., assignor to Whit Corporation, Ramseur, N.C.
Filed Nov. 15, 1993, Ser. No. 15,317
Term of patent 14 years
U.S. Cl. D4—116



366,963

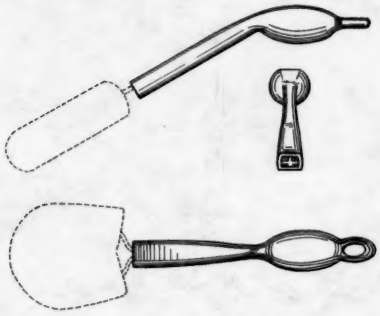
**BRUSH HANDLE**

Enzo Berti, Venice, Italy, assignor to The Libman Company, Arcola, Ill.

Filed Nov. 1, 1994, Ser. No. 30,514

Term of patent 14 years

U.S. Cl. D4—138



366,964

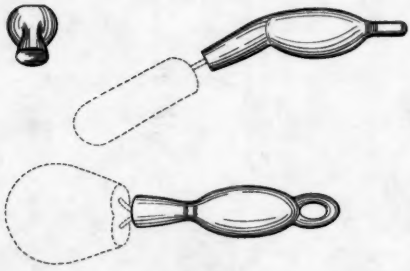
**BRUSH HANDLE**

Enzo Berti, Venice, Italy, assignor to The Libman Company, Arcola, Ill.

Filed Nov. 1, 1994, Ser. No. 30,540

Term of patent 14 years

U.S. Cl. D4—138



366,965

**INFANT CAR SEAT**

Paul K. Meeker, Hiram, and William R. Gibson, Canton, both of Ohio, assignors to Lisco, Inc., Tampa, Fla.

Filed Nov. 3, 1994, Ser. No. 30,630

Term of patent 14 years

U.S. Cl. D6—333

366,966

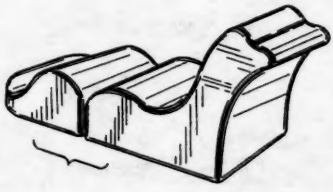
**COMBINED JUVENILE SEAT WITH FOOTREST**

Vincenzo A. Bonaddio, Rancho Santa Margarita, and Jose De Jesus Munoz Contreras, Apple Valley, both of Calif., assignors to Foamex L.P., Linwood, Pa.

Filed Jan. 23, 1995, Ser. No. 33,866

Term of patent 14 years

U.S. Cl. D6—335



366,967

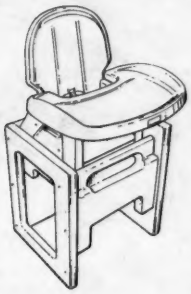
CONVERTIBLE HIGH CHAIR

Paul K. Meeker, Hiram; William R. Gibson, Canton, and Jeffrey T. Champ, Aurora, all of Ohio, assignors to Lisco, Inc., Tampa, Fla.

Filed Nov. 1, 1994, Ser. No. 30,561

Term of patent 14 years

U.S. Cl. D6—339



366,968

FOOTSTOOL

Robert F. Elsbury, Sherrard, Ill., assignor to B & B Crafts Inc., Sherrard, Ill.

Filed Feb. 9, 1995, Ser. No. 34,622

Term of patent 14 years

U.S. Cl. D6—351

366,969

SEAT

Thomas Sauvage, Saint Martin d'Uriage, France, assignor to Allibert, Nanterre, France

Filed Jan. 24, 1995, Ser. No. 33,942

Claims priority, application Hague Agreement, Aug. 2, 1994, DM/030 319

Term of patent 14 years

U.S. Cl. D6—368

366,970

BUNK BED

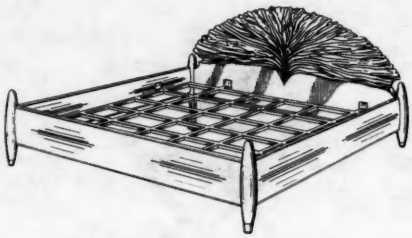
Patrick L. Pollard, Columbus, Ga., assignor to Baby's Dream Furniture, Inc., Buena Vista, Ga.

Filed Nov. 4, 1994, Ser. No. 30,710

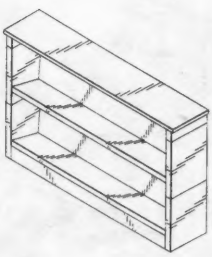
Term of patent 14 years

U.S. Cl. D6—383

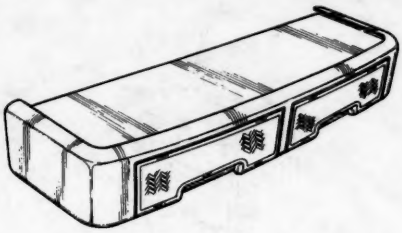
366,971
FAN CORAL BED
Michael S. Reese, P.O. Box 163241, Austin, Tex.
Filed Mar. 29, 1995, Ser. No. 36,861
Term of patent 14 years
U.S. Cl. D6—388



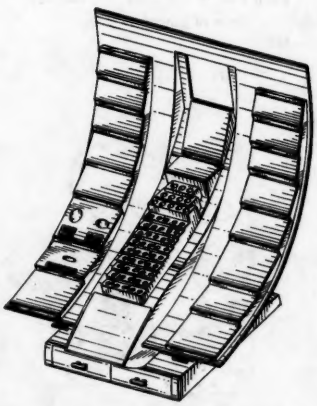
366,972
CD HOLDER
Janet Thompson, 8207 DeLongpre Ave., #8, Los Angeles, Calif. 90046
Filed Apr. 12, 1993, Ser. No. 6,965
Term of patent 14 years
U.S. Cl. D6—407



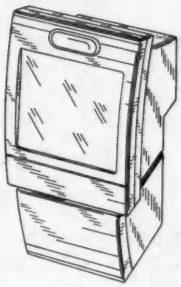
366,973
SHELF AND DRAWER UNIT
D. Scott Miller, Orlando, Fla., and John F. Travers, North Royalton, Ohio, assignors to Rubbermaid Incorporated, Wooster, Ohio
Filed Dec. 14, 1994, Ser. No. 32,177
Term of patent 14 years
U.S. Cl. D6—445



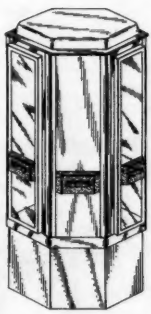
366,974
DISPLAY RACK
David E. Nitlich, Paris, France, assignor to Parfums Christian Dior, Paris, France
Filed Jul. 5, 1994, Ser. No. 25,555
Claims priority, application WIPO, Jan. 24, 1994, DM/028443
Term of patent 14 years
U.S. Cl. D6—468



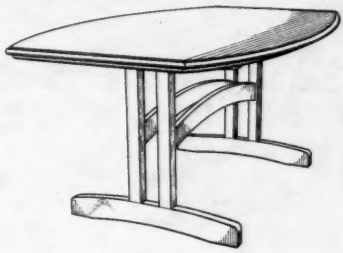
366,975
KIOSK
Gary Kaga, West Vancouver, Canada, assignor to Dynapro Systems Inc., New Westminster, Canada
Filed Oct. 12, 1994, Ser. No. 29,653
Term of patent 14 years
U.S. Cl. D6—470



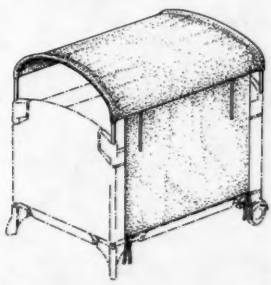
366,976
SIX-SIDED REFRIGERATED MERCHANDISER
Rafael T. Bustos, Alpharetta, Ga., assignor to L&P Property Management Company, Chicago, Ill.
Filed Nov. 17, 1994, Ser. No. 31,089
Term of patent 14 years
U.S. Cl. D6—470



366,977
TABLE
John S. Pratt, 960 Winding Creek Trail, Atlanta, Ga. 30328
Filed Nov. 8, 1994, Ser. No. 30,780
Term of patent 14 years
U.S. Cl. D6—480

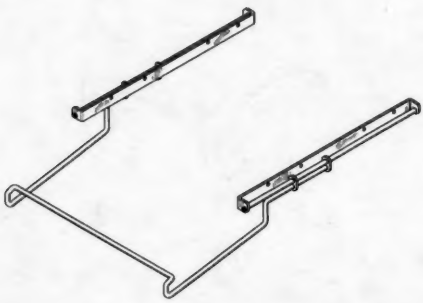


366,978
REMOVABLE PLAYYARD CANOPY
John V. Mariol, Cincinnati, Ohio, assignor to Lisco, Inc., Tampa, Fla.
Filed Nov. 4, 1994, Ser. No. 30,632
Term of patent 14 years
U.S. Cl. D6—491

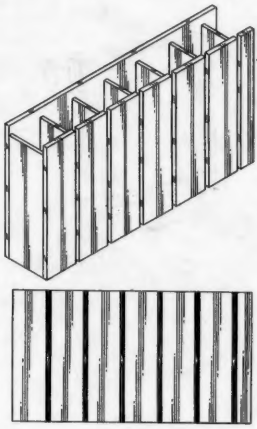


366,979
CHAIR GUARD
Peter Opsvik, Oslo, Norway, assignor to Stokke Industri AS, Norway
Filed May 25, 1994, Ser. No. 23,509
Claims priority, application Norway, Jan. 14, 1994, 940017
Term of patent 14 years
U.S. Cl. D6—500

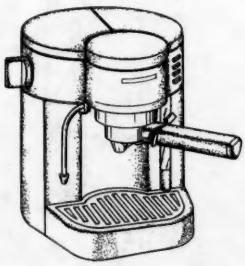
366,980
SLIDE TRAY
Harry C. Sweere, 5637 Woodlawn Blvd., Minneapolis, Minn. 55417
Filed Jul. 11, 1994, Ser. No. 25,790
Term of patent 14 years
U.S. Cl. D6—510



366,981
HAND SAW HOLDER
Phillip C. Kraft, P.O. Box 512, Lower Lake, Calif. 95457
Filed Jan. 31, 1995, Ser. No. 34,276
Term of patent 14 years
U.S. Cl. D6—569



366,982
PUMP-TYPE ESPRESSO MACHINE
Richard Amiel, Thal, Switzerland, assignor to Arthur Eugster AG, Romanshorn, Switzerland
Filed Mar. 3, 1994, Ser. No. 19,483
Term of patent 14 years
U.S. Cl. D7—309

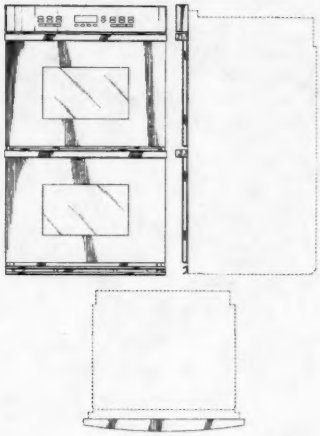


366,983

**FRONT PANEL FOR A WALL OVEN**

Alan Leukhardt, La Verne; James Layfield, Jr., Palmdale, and Ray G. Smith, Los Angeles, all of Calif., assignors to Dacor, Pasadena, Calif.

Filed May 13, 1994, Ser. No. 22,883
Term of patent 14 years
U.S. Cl. D7—349

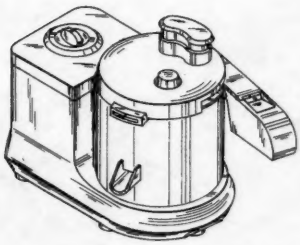


366,984

**MULTI-FOOD PROCESSOR AND JUICE EXTRACTOR**

Maxwell Hsu, Taipei, Taiwan, Prov. of China, assignor to Airlux Electrical Co., Ltd., Taipei, Taiwan, Prov. of China

Filed Aug. 29, 1994, Ser. No. 27,804
Term of patent 14 years
U.S. Cl. D7—376

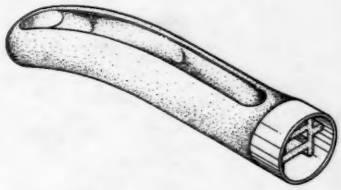


366,985

**HANDLE OF POTS AND PANS**

Ming-Tsang Tu, 7FL., No. 96, Jan-Ai 1st St., Kaohsiung, Taiwan, Prov. of China

Filed Jan. 4, 1995, Ser. No. 33,075
Term of patent 14 years
U.S. Cl. D7—395

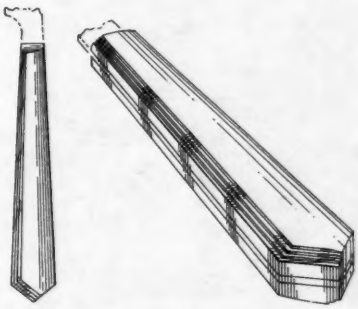


366,986

**CUTLERY HANDLE**

David M. Williams, Sheffield, United Kingdom, assignor to McPherson's Limited, Victoria, Australia

Filed Nov. 1, 1993, Ser. No. 14,870
Term of patent 14 years
U.S. Cl. D7—401.2



366,987

SPILL-PROOF CUP

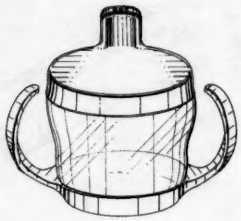
Jean-Paul Allegre, Saint-Etienne, France, assignor to Allegre Puericulture Hygiene S.A., France

Filed Oct. 6, 1994, Ser. No. 29,475

Claims priority, application France, Apr. 6, 1994, 942.097

Term of patent 14 years

U.S. Cl. D7—510



366,988

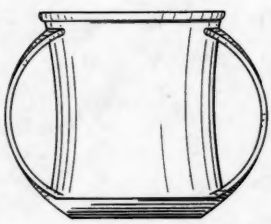
CUP

Ralph M. Nowak, Marblehead, Mass., assignor to Kiddie Products, Inc., Avon, Mass.

Filed Oct. 6, 1994, Ser. No. 29,463

Term of patent 14 years

U.S. Cl. D7—534



366,989

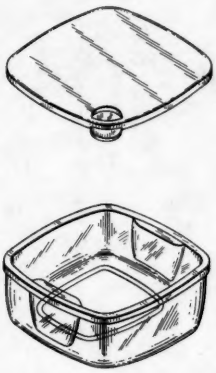
STORAGE CONTAINER

Larry G. Zimmerman, Hollis, N.H., assignor to Sterilite Corporation, Townsend, Mass.

Filed Sep. 2, 1994, Ser. No. 28,030

Term of patent 14 years

U.S. Cl. D7—629



366,990

CUTLERY STAND

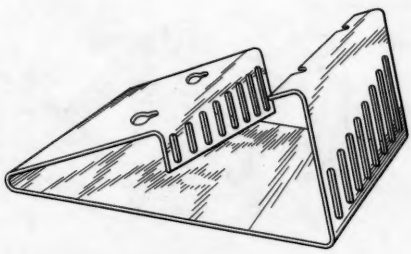
Gary Cheung, 23 Mount Stephen Street, Toronto, Ontario, Canada

Filed Jul. 27, 1994, Ser. No. 26,375

Claims priority, application Canada, Feb. 3, 1994, 1994-0168

Term of patent 14 years

U.S. Cl. D7—637



366,991

**CUTLERY, COMPRISING FORK, KNIFE AND SPOON**

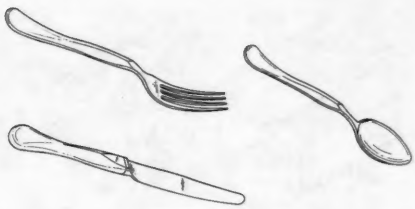
Paolo Bulgari, Rome, Italy, assignor to Partecipazioni Bulgari S.p.A., Rome, Italy

Filed Jun. 16, 1994, Ser. No. 24,590

Claims priority, application Hague Agreement, Dec. 17, 1993, DM/028.159

Term of patent 14 years

U.S. Cl. D7—645



366,992

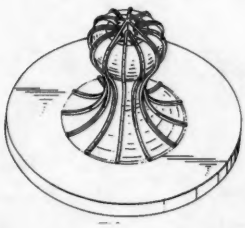
**JUICE REAMER**

Robin W. Ruck, Southbury, Conn., assignor to Dynamics Corporation of America Through Waring Products Division, New Hartford, Conn.

Filed Dec. 27, 1994, Ser. No. 32,738

Term of patent 14 years

U.S. Cl. D7—665



366,993

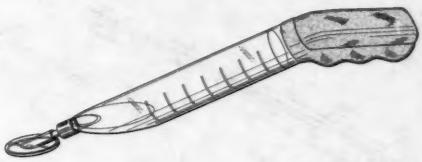
**FOOD BASTING TOOL**

Douglas R. Fielding, and Charles S. Adams, both of Berkeley, Calif., assignors to Charcoal Companion, Inc., Oakland, Calif.

Filed Jan. 31, 1995, Ser. No. 34,256

Term of patent 14 years

U.S. Cl. D7—669



366,994

**PLUMB BOB STRING HOLDER**

Gary L. Byers, and Timothy W. Byers, both of Hwy. 93, Whitefish, Mont. 59937

Filed Apr. 11, 1994, Ser. No. 21,140

Term of patent 14 years

U.S. Cl. D8—14

366,995

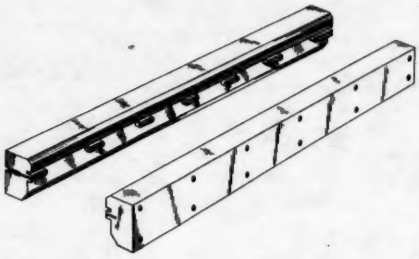
PAIR OF POUCH FORMING TOOL JAWS

Steven D. Davis, Yuciappa, Calif., assignor to W. A. Lane, Inc., San Bernardino, Calif.

Filed Dec. 2, 1994, Ser. No. 31,684

Term of patent 14 years

U.S. Cl. D15—146



366,996

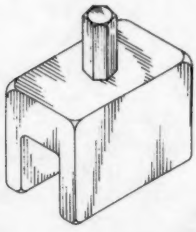
MUSICAL DRUM TUNING KEY

Jose Torres, 334 Prospect Heights, Pawtucket, R.I. 02860

Filed Apr. 8, 1994, Ser. No. 21,079

Term of patent 14 years

U.S. Cl. D8—29



366,997

CAN OPENER

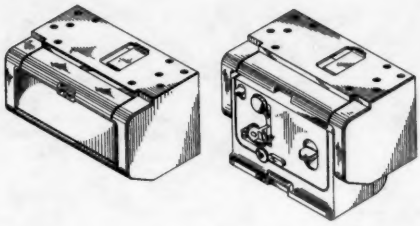
Richard Carbone, Southbury, Conn., and Alvaro Correa, Bridgeman, Mich., assignors to Black & Decker Inc., Newark, Del.

Filed Nov. 22, 1993, Ser. No. 15,612

The portion of the term of this patent subsequent to Oct. 3, 2009, has been disclaimed.

Term of patent 14 years

U.S. Cl. D8—36



366,998

KNOB

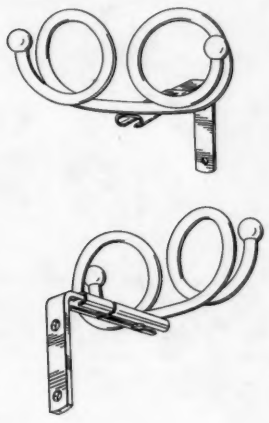
Frances G. Hollingsworth, McHenry, Ill., assignor to Newell Operating Company, Freeport, Ill.

Filed Aug. 3, 1994, Ser. No. 26,686

Term of patent 14 years

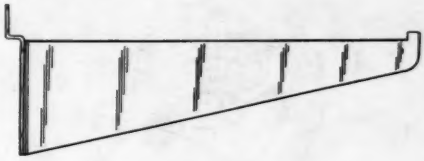
U.S. Cl. D8—307

366,999
CURTAIN HANGER
Morris Ferdman, 590 Steeprock Drive, Downsview, Ontario, Canada
Division of Ser. No. 8,299, May 13, 1993, Pat. No. Des. 357,624. This application Dec. 20, 1994, Ser. No. 32,482
Claims priority, application Canada, Nov. 13, 1992, 13-11-92-6
Term of patent 14 years
U.S. Cl. D8—368

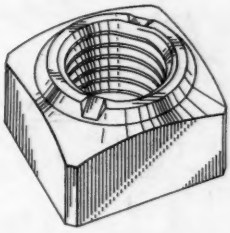


367,000
CONTAINER HOLDER
Myron D. Martin, 3011 Strauss, Toledo, Ohio 43606
Filed Nov. 23, 1993, Ser. No. 15,659
Term of patent 14 years
U.S. Cl. D8—370

367,001
SHELF BRACKET
Joseph P. Bright, Perrysburg, Ohio, assignor to Industrial Dimensions, Inc., Fostoria, Ohio
Filed Feb. 22, 1995, Ser. No. 35,203
Term of patent 14 years
U.S. Cl. D8—381



367,002
RAILROAD LOCK NUT FASTENER
John J. Grey, Berea, Ohio, assignor to Barnes Group, Bristol, Conn.
Filed Sep. 21, 1993, Ser. No. 13,196
Term of patent 14 years
U.S. Cl. D8—397



367,003

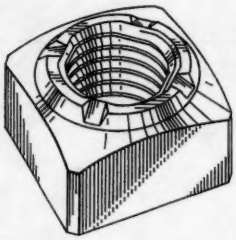
**RAILROAD LOCK NUT FASTENER**

John J. Grey, Berea, Ohio, assignor to Barnes Group, Bristol, Conn.

Filed Aug. 30, 1993, Ser. No. 12,330

Term of patent 14 years

U.S. Cl. D8—397



367,004

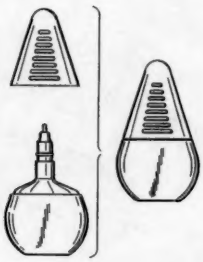
**FLUID DISPENSER**

Walter B. Herbst, Evanston; John D. Hartman, and Mikael R. Backstrom, both of Chicago, all of Ill., assignors to The Gillette Company, Boston, Mass.

Continuation-in-part of Ser. No. 19,832, Mar. 11, 1994. This application Aug. 12, 1994, Ser. No. 26,911

Term of patent 14 years

U.S. Cl. D9—300



367,005

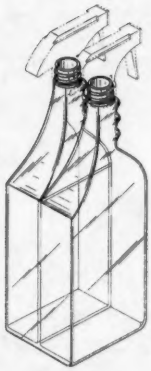
**DUAL COMPARTMENT DISPENSING BOTTLE**

Terence J. Warrilow, 115 Parkerwood Way, Alpharetta, Ga. 30202

Filed Jun. 10, 1994, Ser. No. 24,256

Term of patent 14 years

U.S. Cl. D9—341



367,006

**BABY BOTTLE CAP**

Wade R. Schauer, and Janine Schauer, both of 8055 Rosebery Ct., Sacramento, Calif. 95829

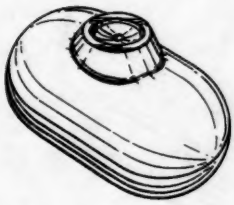
Filed Jan. 9, 1995, Ser. No. 33,281

Term of patent 14 years

U.S. Cl. D9—436

367,007
BOTTLE STOPPER
Denise Paglina, New York, N.Y., assignor to Elizabeth Arden Company, Division of Conopco, Inc., New York, N.Y.
Filed Oct. 7, 1994, Ser. No. 29,541
Term of patent 14 years
U.S. Cl. D9—439

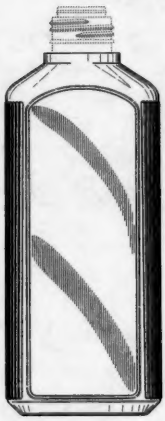
367,008
HEAD FORMING INSERT, ESPECIALLY FOR USE IN BOTTLES
Mark E. Sillince, Bedfordshire, United Kingdom, and Erwin A. Rosens, Alphen A/D Rign, Netherlands, assignors to Whitbread PLC, London, Great Britain, and Heineken Technical, Amsterdam, Netherlands
Filed Jan. 6, 1995, Ser. No. 33,241
Claims priority, application United Kingdom, Jul. 7, 1994, 2040177
Term of patent 14 years
U.S. Cl. D9—456



367,009
CONTAINER FOR PERFUMES AND COSMETIC PRODUCTS
Pierre Dinand, Levallois Perret, France, assignor to Euroitalia S.r.l., Monza, Italy
Filed Nov. 8, 1994, Ser. No. 30,802
Claims priority, application Italy, Jul. 29, 1994, MI9400399
Term of patent 14 years
U.S. Cl. D9—519

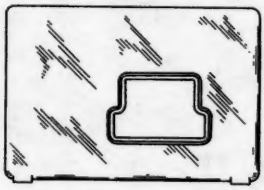
367,010
CONTAINER AND CAP
James R. Moore, Allegan, and Richard F. Schmiege, Kalamazoo, both of Mich., assignors to L. Perrigo Company, Allegan, Mich.
Filed Nov. 7, 1991, Ser. No. 788,756
Term of patent 14 years
U.S. Cl. D9—542

367,011
BOTTLE
April Y. Lilly, San Ramon, and Charlene Y. Chang, San Francisco, both of Calif., assignors to The Clorox Company, Oakland, Calif.
Filed Nov. 16, 1994, Ser. No. 31,066
Term of patent 14 years
U.S. Cl. D9—550

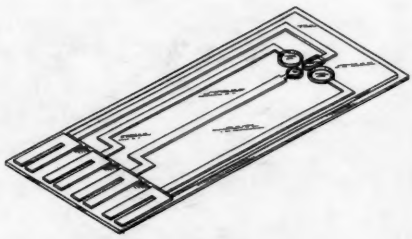


367,012
VEHICLE SLEEP TIMER
John Billingsley, 87 Maryland Dr., Battle Creek, Mich. 49017
Filed Aug. 24, 1994, Ser. No. 27,550
Term of patent 14 years
U.S. Cl. D10—40

367,013
ELECTRICAL CURRENT SENSOR
Pierre Cattaneo, Collonges S/Saleve, France, assignor to Liaisons Electroniques-Mecaniques Lem S.A., Switzerland
Filed Apr. 13, 1995, Ser. No. 37,473
Claims priority, application Hague Agreement, Jan. 23, 1995, DM/031 885
Term of patent 14 years
U.S. Cl. D10—75



367,014
SOLID STATE PLANAR SENSOR
Paul A. D'Orazio, Mendon, and James E. Flaherty, Attleboro, both of Mass., assignors to Ciba Corning Diagnostics Corp., Medfield, Mass.
Filed Jun. 27, 1994, Ser. No. 25,127
Term of patent 14 years
U.S. Cl. D10—81



367,015

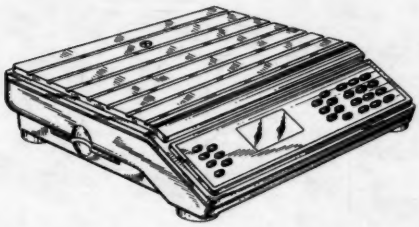
**POSTAGE COMPUTING SCALE WITH METER INTERFACE**

David H. Brooks, Jr., Wilton, Conn., assignor to Pitney Bowes, Inc., Stamford, Conn.

Filed Dec. 14, 1994, Ser. No. 32,200

Term of patent 14 years

U.S. Cl. D10—91



367,016

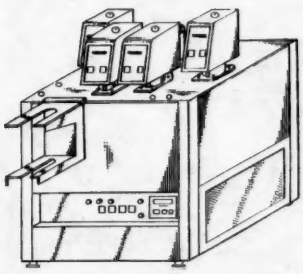
**SENSITIVE ROTATING VISCOMETER INSTRUMENT WITH A WINGED MULTIPLE HEAD ARRAY**

Theodore W. Selby; Gregory C. Miiller; Kevin J. Wolfe, all of Midland, and Michael A. Tubbs, Zeeland, all of Mich., assignors to Tannas Co., Midland, Mich.

Filed Nov. 8, 1994, Ser. No. 30,794

Term of patent 14 years

U.S. Cl. D10—96



367,017

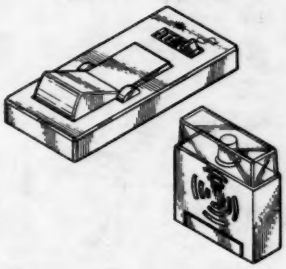
**COMBINED TRANSMITTER AND RECEIVER FOR LOCATING LOST REMOTE CONTROL UNIT**

Mark A. Dempsey, 528 N. 65th St., Kansas City, Kans. 66102-3031

Filed Jan. 31, 1995, Ser. No. 34,270

Term of patent 14 years

U.S. Cl. D10—104



367,018

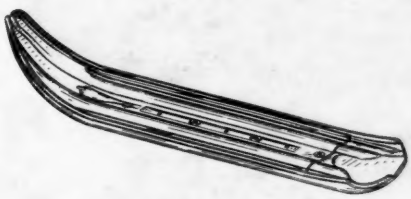
**SNOWMOBILE RUNNER**

Jomar P. Bernat, Roseau, Minn., assignor to Polaris Industries Partners L.P., Minneapolis, Minn.

Filed Oct. 25, 1993, Ser. No. 13,779

Term of patent 14 years

U.S. Cl. D12—7



367,019

Patent Not Issued For This Number

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367,020

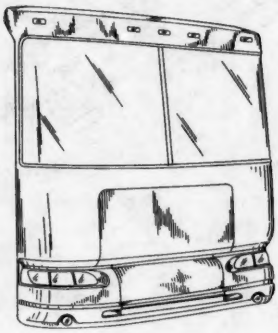
MOTORHOME FRONT PANEL UNIT EXTERIOR SURFACE

James F. Shea, Sr., South Bend, Ind., assignor to Gulf Stream Coach, Inc., Nappanee, Ind.

Filed May 6, 1994, Ser. No. 22,546

Term of patent 14 years

U.S. Cl. D12—100



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367,021

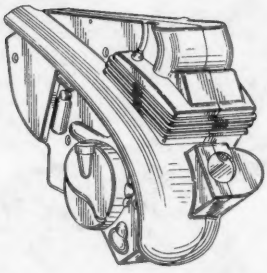
SIMULATED MOTORCYCLE ENGINE FOR A BICYCLE

David K. Camfield, and Daniel F. Brashear, both of Olney, Ill., assignors to Roadmaster Corporation, Olney, Ill.

Filed Nov. 14, 1994, Ser. No. 30,962

Term of patent 14 years

U.S. Cl. D12—114



367,022

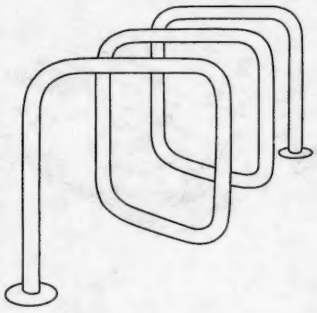
BICYCLE RACK

Thomas L. Graber, Middleton, Wis., assignor to Madrax, Inc., Middleton, Wis.

Filed Mar. 10, 1995, Ser. No. 36,035

Term of patent 14 years

U.S. Cl. D12—115



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367,023

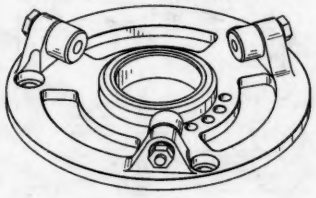
CLUTCH COVER PLATE

Steven R. Benson, 5919 S. 350 West, Murray, Utah 84107

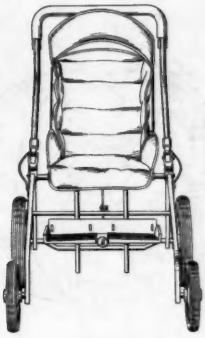
Filed Mar. 20, 1995, Ser. No. 36,433

Term of patent 14 years

U.S. Cl. D12—126

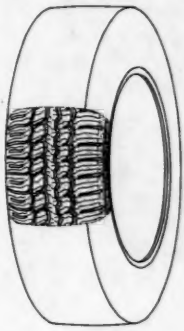


367,024
WHEEL CHAIR
Flemming Moeller, Soevind, Denmark, assignor to R82 A/S, Gedved, Denmark
Filed Mar. 30, 1995, Ser. No. 36,899
Term of patent 14 years
U.S. Cl. D12—131

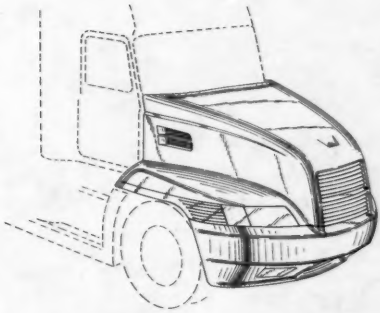


367,025
TIRE
Robin B. Faulk, Gray Court, and Jonathan B. Henderson, Laurens, both of S.C., assignors to Michelin Recherche et Technique S.A., Granges-Paccot, Switzerland
Filed Jun. 15, 1994, Ser. No. 24,574
Term of patent 14 years
U.S. Cl. D12—141

367,026
TIRE
Eileen A. McKisson, Akron, Ohio, assignor to Michelin Recherche et Technique S.A., Granges Paccot, Switzerland
Filed Dec. 6, 1993, Ser. No. 16,043
Term of patent 14 years
U.S. Cl. D12—146



367,027
TRUCK HOOD AND BUMPER
David P. Onopa, Allentown, Pa., assignor to Mack Trucks, Inc., Allentown, Pa.
Filed Sep. 28, 1994, Ser. No. 29,045
Term of patent 14 years
U.S. Cl. D12—173



367,028

VEHICLE REAR BUMPER

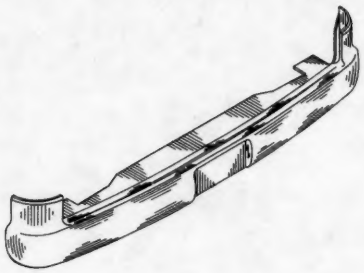
Jim R. Fairweather, 1319 N. Frankwood, Reedley, Calif. 93654

Filed Mar. 16, 1994, Ser. No. 20,162

The portion of the term of this patent subsequent to Jun. 27, 2009, has been disclaimed.

Term of patent 14 years

U.S. Cl. D12—169



367,029

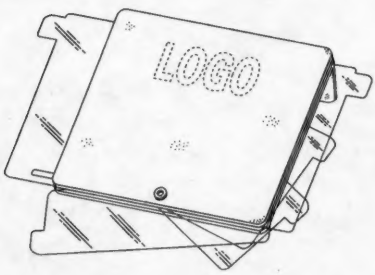
SUNVISOR EXTENDER WITH MULTIPLE SHADES

Patsy K. Spaulding, R.R. Box 1284, Hop Bottom, Pa. 18824

Filed Jan. 5, 1995, Ser. No. 33,139

Term of patent 14 years

U.S. Cl. D12—191




367,030

WHEEL

Vahe Bouldoukian, Sindelfingen, Germany, assignor to Mercedes-Benz AG, Stuttgart, Germany

Filed Mar. 30, 1994, Ser. No. 20,629

Claims priority, application Germany, Sep. 30, 1993, M 93 07 573.1

Term of patent 14 years

U.S. Cl. D12—209

367,031

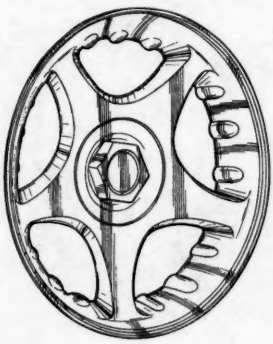
FRONT FACE FOR A VEHICLE WHEEL

Robert N. Hubbach, Clarkston, Mich., assignor to Chrysler Corporation, Highland Park, Mich.

Continuation-in-part of Ser. No. 6,501, Mar. 31, 1993. This application Jun. 30, 1994, Ser. No. 25,406

Term of patent 14 years

U.S. Cl. D12—209



367,032

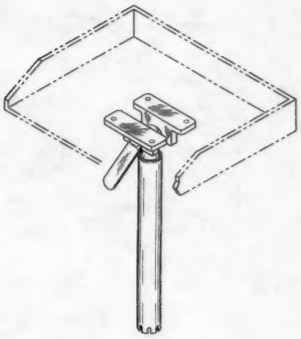
ADJUSTABLE SUPPORTING SURFACE

Delmar G. Fentress, Largo, and Allen C. McManaway, North Redington Beach, both of Fla., assignors to Fentress Marine, Largo, Fla.

Filed Dec. 14, 1994, Ser. No. 32,206

Term of patent 14 years

U.S. Cl. D12—317



367,033

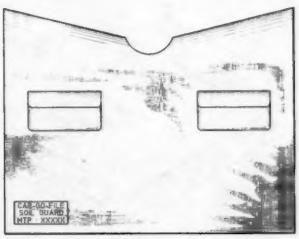
SOIL GUARD

George A. Phirippidis, 5815 Commerce Dr., Fremont, Calif. 94555

Filed Aug. 10, 1994, Ser. No. 26,984

Term of patent 14 years

U.S. Cl. D12—400




367,034

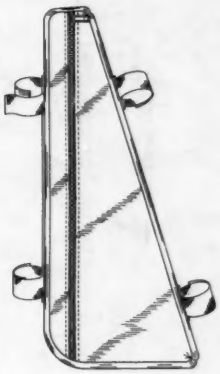
BICYCLE BAG

John A. Berman, San Anselmo, Calif., assignor to Dynacraft Industries Inc., Ashland, Mass.

Filed Oct. 25, 1994, Ser. No. 30,265

Term of patent 14 years

U.S. Cl. D12—409



367,035

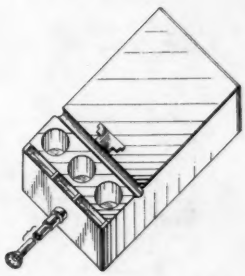
ARTICLES SUPPORT CONSOLE FOR AUTOMOBILES

Betty M. Wells, 8907 W. 77th Pl., Arvada, Colo. 80005

Filed May 3, 1993, Ser. No. 7,781

Term of patent 14 years

U.S. Cl. D12—419



367,036

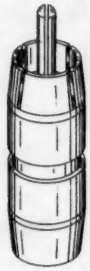
CABLE CONNECTOR WITH SYMMETRICAL HOUSING

Noel Lee, Daly City, Calif., assignor to Monster Cable International, Ltd., Hamilton, Bermuda

Filed Dec. 22, 1994, Ser. No. 32,630

Term of patent 14 years

U.S. Cl. D13—133



367,037

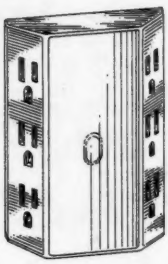
ELECTRICAL OUTLET UNIT

Philip Fladung, and Mark W. Geis, both of Carmel, Ind., assignors to Woods Industries, Inc., Carmel, Ind.

Filed Jan. 17, 1995, Ser. No. 33,621

Term of patent 14 years

U.S. Cl. D13—139



367,038

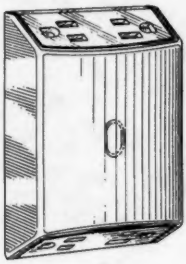
ELECTRICAL OUTLET UNIT

Philip Fladung, and Mark W. Geis, both of Carmel, Ind., assignors to Woods Industries, Inc., Carmel, Ind.

Filed Jan. 17, 1995, Ser. No. 33,627

Term of patent 14 years

U.S. Cl. D13—139



367,039

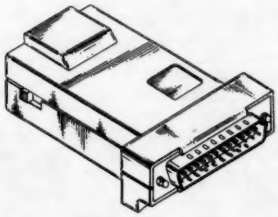
NETWORK ADAPTOR

Pit-Kin Loh, Seremban, Malaysia, assignor to PK Electronic Industries SDN BHD, Seremban, Malaysia

Filed May 10, 1994, Ser. No. 22,645

Term of patent 14 years

U.S. Cl. D13—147



367,040

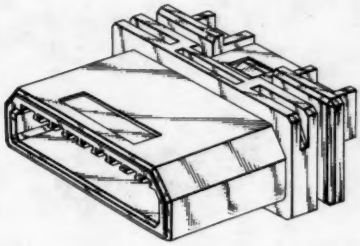
MULTI WAY CONNECTOR

Shinobu Hamada, Tokyo, Japan, assignor to Sega Enterprises, Ltd., Tokyo, Japan

Filed Jan. 30, 1995, Ser. No. 34,216

Term of patent 14 years

U.S. Cl. D13—147



367,041

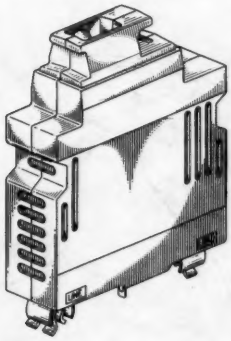
FUSED DISCONNECT SWITCH

Conrad Alfaro, Harwood Heights, and Lawrence Happ, Mundelein, both of Ill., assignors to Cooper Industries, Inc., Houston, Tex.

Filed May 20, 1994, Ser. No. 23,234

Term of patent 14 years

U.S. Cl. D13—160



367,042

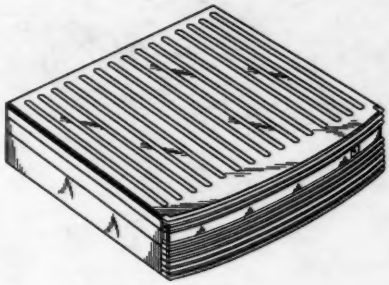
ELECTRONIC EQUIPMENT HOUSING

Ernest J. Morrow, Damascus, and Gregory C. Braunberg, Gaitherburg, both of Md., assignors to Hughes Aircraft Company, Los Angeles, Calif.

Filed Dec. 21, 1994, Ser. No. 32,541

Term of patent 14 years

U.S. Cl. D13—184



367,043

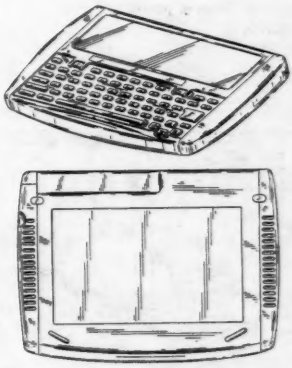
MOBILE COMMUNICATOR COMPUTER

David J. Ross, Leesburg, Va.; Blake L. Isaacs, Logan, Utah, and Paul T. Skaggs, Spokane, Wash., assignors to AMSC Subsidiary Corporation, Reston, Va.

Filed Mar. 21, 1995, Ser. No. 36,572

Term of patent 14 years

U.S. Cl. D14—100



367,044

TRANSACTION TERMINAL CONSOLE

James S. Arakaki, Auburn, Calif., assignor to Verifone Inc., Redwood City, Calif.

Filed Feb. 24, 1995, Ser. No. 35,312

Term of patent 14 years

U.S. Cl. D14—105

367,045

INFORMATION STORAGE AND RETRIEVAL DEVICE

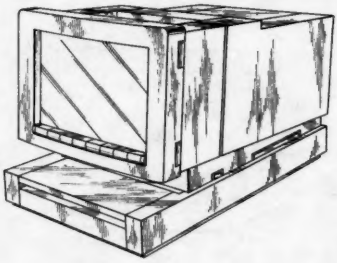
Yoshiyuki Matsuda, Kokubunji, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 12, 1994, Ser. No. 28,263

Claims priority, application Japan, Mar. 15, 1994, 6-6844

Term of patent 14 years

U.S. Cl. D14—106



367,046

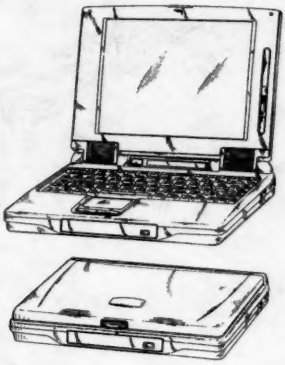
COMPUTER

Shinya Haraga, and Hajime Sekino, both of Tottori, Japan, assignors to Tottori Sanyo Electric Co., Ltd., Tottori, Japan

Filed May 5, 1995, Ser. No. 38,517

Term of patent 14 years

U.S. Cl. D14—106



367,047

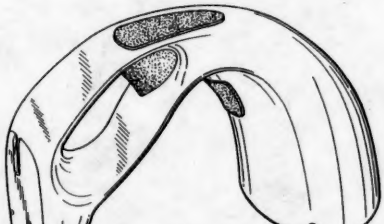
THREE-DIMENSIONAL MOUSE

Oliver Hood, Dublin; John Doyle, Tralee, both of, Ireland; Jay Wilson; Tareq Abed, both of Palo Alto, Calif., and John O'Connell, Mallow, Ireland, assignors to Alps Electric (Ireland), Ltd., Millstreet Town, Ireland

Filed Mar. 7, 1994, Ser. No. 19,608

Term of patent 14 years

U.S. Cl. D14—114



367,048

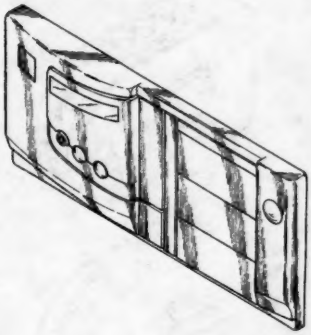
**FRONT PANEL FOR A COMPUTER CABINET**

Chung-Sung Lin, Shu Lin Town, Taiwan, Prov. of China, assignor to Macase of Georgia, Inc., Norcross, Ga.

Filed Aug. 9, 1994, Ser. No. 26,923

Term of patent 14 years

U.S. Cl. D14—115



367,049

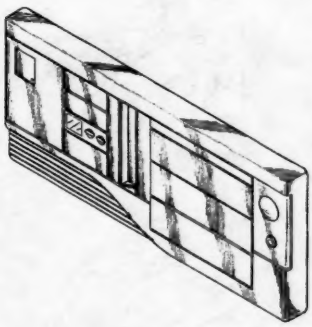
**COMPUTER CABINET FRONT PANEL**

Chun-Sung Lin, Shu Lin Town, Taiwan, Prov. of China, assignor to Macase of Georgia, Inc., Norcross, Ga.

Filed Aug. 9, 1994, Ser. No. 26,917

Term of patent 14 years

U.S. Cl. D14—115



367,050

**MAGNETIC TAPE CARTRIDGE**

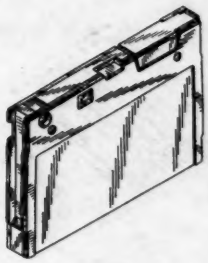
Osamu Koizumi, and Taizou Aizawa, both of Tokyo, Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Feb. 3, 1994, Ser. No. 18,340

Claims priority, application Japan, Aug. 31, 1993, 5-26344

Term of patent 14 years

U.S. Cl. D14—121



367,051

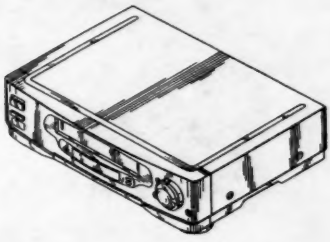
**VIDEO CASSETTE RECORDER**

Kuninori Hyogo, Tokyo, Japan, assignor to Sony Corporation, Tokyo, Japan

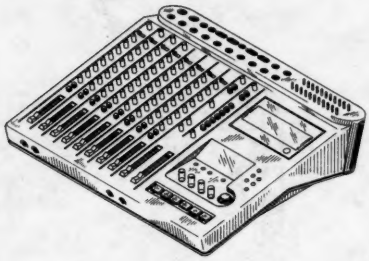
Filed Sep. 21, 1994, Ser. No. 28,739

Term of patent 14 years

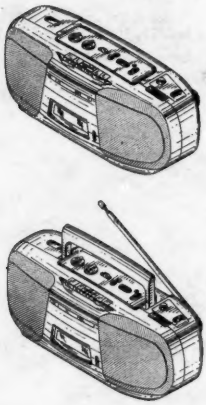
U.S. Cl. D14—135



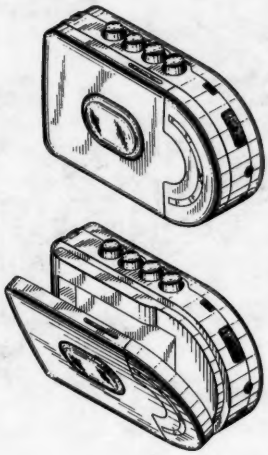
367,052
COMBINED AUDIO MIXER AND TAPE RECORDER
Masafumi Ito; Shigeru Hasegawa; Katsuhiro Takashima; Keiji Tsunoda, and Yasunobu Shimizu, all of Musashino, Japan, assignors to TEAC Corporation, Japan
Filed Nov. 29, 1994, Ser. No. 31,506
Claims priority, application Japan, Jun. 3, 1994, 6-16245
Term of patent 14 years
U.S. Cl. D14—162



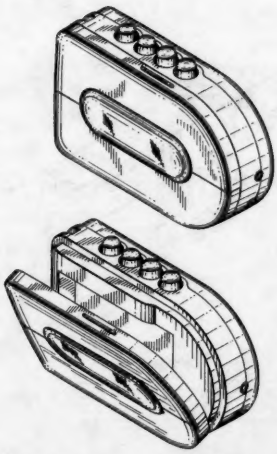
367,053
COMBINED TAPE PLAYER AND RADIO RECEIVER
Shinichi Ogasawara, and Akira Okada, both of Tokyo, Japan, assignors to Sony Corporation, Tokyo, Japan
Filed Feb. 17, 1994, Ser. No. 18,881
Claims priority, application Japan, Sep. 7, 1993, 5-26985
Term of patent 14 years
U.S. Cl. D14—163



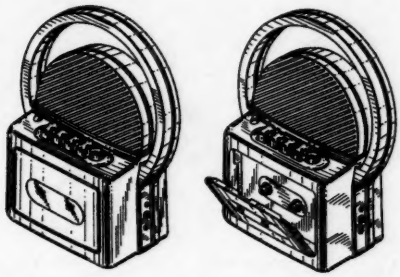
367,054
COMBINED TAPE PLAYER AND RADIO TUNER
Yasuaki Isonaga, Tokyo, Japan, assignor to Sony Corporation, Tokyo, Japan
Filed May 31, 1994, Ser. No. 23,729
Claims priority, application Japan, Dec. 3, 1993, 5-36502
Term of patent 14 years
U.S. Cl. D14—163



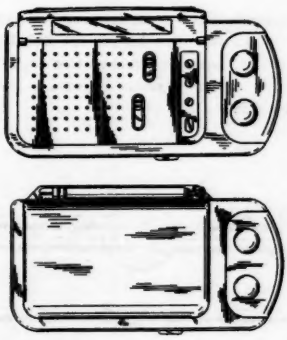
367,055
TAPE PLAYER
Yasuaki Isonaga, Tokyo, Japan, assignor to Sony Corporation, Tokyo, Japan
Filed May 31, 1994, Ser. No. 23,681
Claims priority, application Japan, Dec. 3, 1993, 5-36503
Term of patent 14 years
U.S. Cl. D14—165



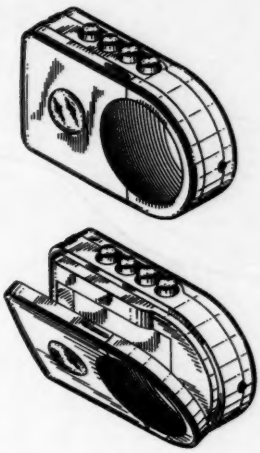
367,056
TAPE RECORDER
Satoshi Suzuki, and Hisanori Narita, both of Yokohama, Japan, assignors to Sony Corporation, Tokyo, Japan
Filed Mar. 22, 1995, Ser. No. 36,526
Term of patent 14 years
U.S. Cl. D14—165



367,057
RADIO CLOCK
L. Ling Wong, Shatin, Hong Kong, assignor to Ballanda Limited, Hong Kong
Filed Oct. 19, 1993, Ser. No. 14,297
Term of patent 14 years
U.S. Cl. D14—171



367,058
COMBINED TAPE PLAYER AND SPEAKER
Yasuaki Isonaga, Tokyo, Japan, assignor to Sony Corporation, Tokyo, Japan
Filed May 31, 1994, Ser. No. 23,735
Claims priority, application Japan, Dec. 3, 1993, 5-36501
Term of patent 14 years
U.S. Cl. D14—172



367,059
FRONT SURFACE FOR A DISPLAY FOR A RADIO PAGER
Lori Vaughn, Lake Worth; Barry S. Boes, Boynton Beach; Steven F. Fradella, Hypoluxo; Jeffrey S. King; Jorge N. Castilla, both of Boynton Beach; Osvaldo D. Romero, Miami; Dan R. Blanton, Boca Raton; Gregary Coonley, Lake Worth, and Eugene Lopatukhin, Boynton Beach, all of Fla., assignors to Motorola, Inc., Schaumburg, Ill.
Filed Nov. 19, 1993, Ser. No. 15,543
Term of patent 14 years
U.S. Cl. D14—191

367,060

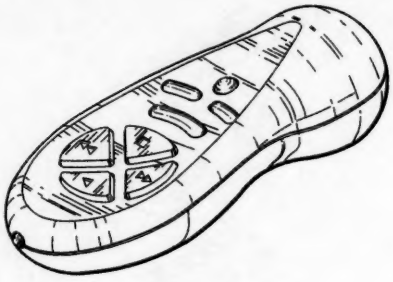
VIDEO REMOTE CONTROL

Sheila R. Augaitis, Fishers, and Robert J. Logan, Indianapolis, both of Ind., assignors to Thomson Consumer Electronics, Inc., Indianapolis, Ind.

Filed Mar. 4, 1994, Ser. No. 19,524

Term of patent 14 years

U.S. Cl. D14—218



367,061

REMOTE CONTROL UNIT

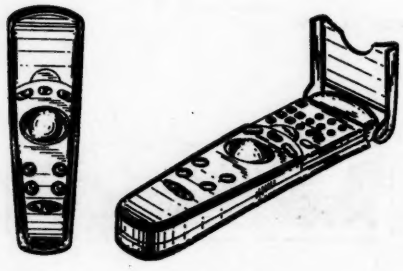
Micke Davison, Le Mesnil Saint Denis, France, assignor to Thomson Consumer Electronics (Société Anonyme), Courbevoie, France

Filed Mar. 11, 1994, Ser. No. 19,876

Claims priority, application France, Jan. 13, 1994, 94 0142

Term of patent 14 years

U.S. Cl. D14—218



367,062

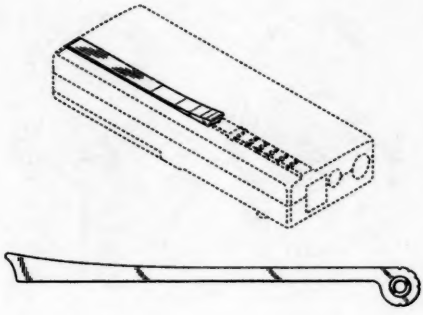
ANTENNA

Mohammed Tahmassebpur, Vancouver, Canada, assignor to Sierra Wireless, Inc., British Columbia, Canada

Filed Apr. 6, 1995, Ser. No. 37,187

Term of patent 14 years

U.S. Cl. D14—230



367,063

ANTENNA

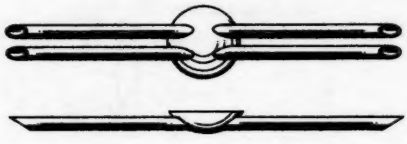
Isabo Fillion-Robin, Les Boisselets, Cersot-Buxy 71390, France

Filed Jun. 18, 1993, Ser. No. 10,742

Claims priority, application France, Dec. 18, 1992, 92 7755

Term of patent 14 years

U.S. Cl. D14—235



367,064

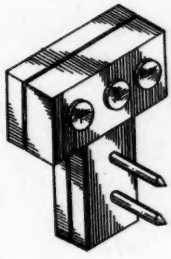
**TELEVISION MUTING CONTROL**

Carolyn F. Gardner, Rte. 2, Box 309, Gutherie, Okla. 73044

Filed Jul. 6, 1994, Ser. No. 25,171

Term of patent 14 years

U.S. Cl. D14—239



367,065

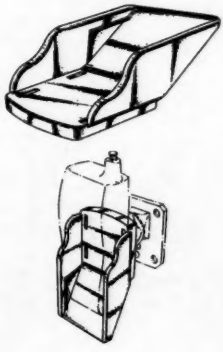
**CELLULAR TELEPHONE RACK**

Michael Wu, Taipei Hsien, Taiwan, Prov. of China, assignor to Formosa Electronic Industries Inc., Taipei, Taiwan, Prov. of China

Filed Mar. 22, 1995, Ser. No. 36,526

Term of patent 14 years

U.S. Cl. D14—253



367,066

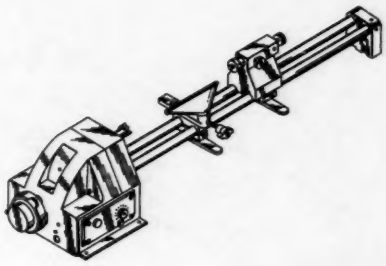
**LATHE**

Ruey-Zon Chen, No. 261, Jen-Hua Rd., Ta-Li City, Taichung Hsien, Taiwan, Prov. of China

Filed Jan. 3, 1995, Ser. No. 32,988

Term of patent 14 years

U.S. Cl. D15—130



367,067

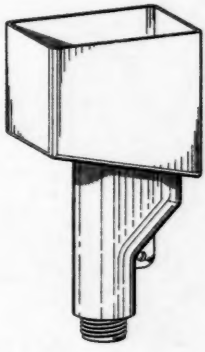
**OIL FILLER**

James L. Speer, 1490 E. Private Rd. 380 North, North Vernon, Ind. 47265

Filed Dec. 5, 1994, Ser. No. 31,730

Term of patent 14 years

U.S. Cl. D15—150

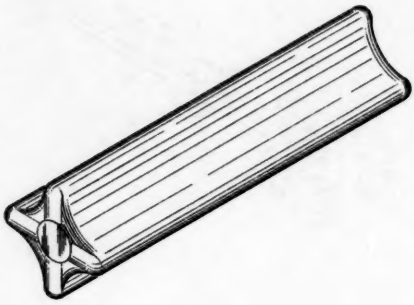


367,068

**RE-FREEZABLE COOLING CARTRIDGE FOR DRINKING BOTTLES**

Dennis E. Green, 102 Falcon Hills Dr., Highlands Ranch, Colo. 80126

Filed Feb. 27, 1995, Ser. No. 35,444
Term of patent 14 years
U.S. Cl. D15—90

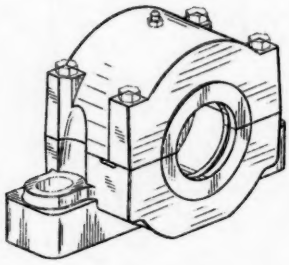


367,069

**PILLOW BLOCK BEARING HOUSING**

Kelsey C. Thom, Jr., Cedar Falls, and William S. Olson, Evansdale, both of Iowa, assignors to California Pellet Mill Company, San Francisco, Calif.

Filed May 15, 1995, Ser. No. 38,885
Term of patent 14 years
U.S. Cl. D15—143

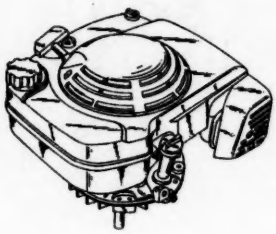


367,070

**INTERNAL COMBUSTION ENGINE**

Joji Maeda, and Masahiro Anzai, both of Wako, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 27, 1994, Ser. No. 32,769
Claims priority, application Japan, Jun. 24, 1994, 6-18467
Term of patent 14 years
U.S. Cl. D15—1

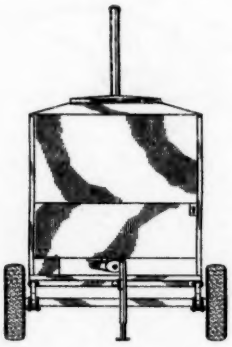


367,071

**COMBINED FEED STORAGE, TRANSPORTER AND DISPENSER FOR ELEVATED FEEDING STATIONS**

Basil W. McKay, Box 96, Kramer Rd., Harper, Tex. 78631

Filed Jul. 5, 1994, Ser. No. 25,507
Term of patent 14 years
U.S. Cl. D15—27



367,072

**VIDEO CAMERA WITH VIDEO TAPE RECORDER**

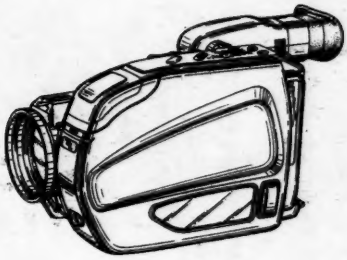
Masaaki Goto, Ehime, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Sep. 22, 1994, Ser. No. 27,996

Claims priority, application Japan, Mar. 23, 1994, 6-7724

Term of patent 14 years

U.S. Cl. D16—202



367,073

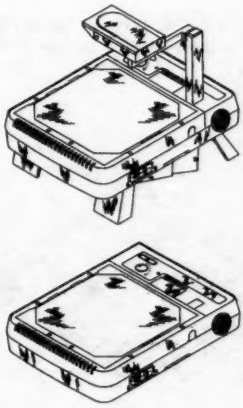
**OVERHEAD PROJECTOR**

Chien-Lung Kuo, and Eric Fan, both of Taipei Hsien, Taiwan, Prov. of China, assignors to Primax Electronics, Ltd., Taipei Hsien, Taiwan, Prov. of China

Filed May 23, 1995, Ser. No. 39,318

Term of patent 14 years

U.S. Cl. D16—232



367,074

**CLARINET LIGATURE**

General J. Gholson, Jr., 1311 Parkland, Memphis, Tenn. 38111

Filed Jan. 30, 1995, Ser. No. 34,204

Term of patent 14 years

U.S. Cl. D17—13

367,075

**PORTABLE PRINTER FOR ADHESIVE BACKED LABELS**

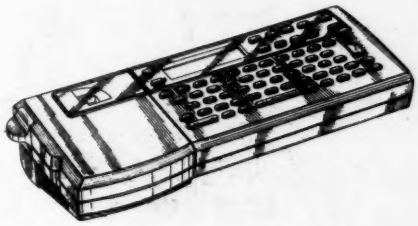
Jonathan Tremlett, London, United Kingdom, assignor to Esselte Dyno N.V., St. Niklaas, Belgium

Filed Jul. 20, 1994, Ser. No. 26,144

Claims priority, application United Kingdom, May 25, 1994, 2039269

Term of patent 14 years

U.S. Cl. D18—52



367,076

BALLPOINT PEN

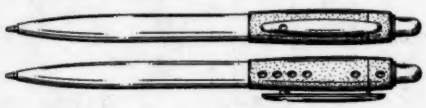
Maria Boix Gacia, Barcelona, Spain, assignor to Inoxcrom, S.A., Barcelona, Spain

Filed Aug. 1, 1994, Ser. No. 27,151

Claims priority, application Spain, Feb. 1, 1994, 131846

Term of patent 14 years

U.S. Cl. D19—51



367,077

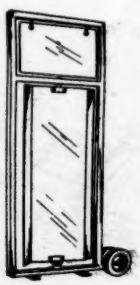
ROTATABLE SIGN

Brian L. Chapman, and Craig J. V. Chapman, both of 138 Avondale Road, Avondale, Christchurch 8006, New Zealand

Filed Sep. 14, 1993, Ser. No. 12,936

Term of patent 14 years

U.S. Cl. D20—21



367,078

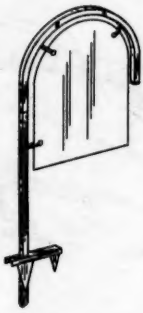
YARD SIGN

William R. M. Oakley, 8340 North Austin Ave., Morton Grove, Ill. 60053

Continuation-in-part of Ser. No. 3,347, Jan. 7, 1993. This application Jan. 17, 1995, Ser. No. 33,640

Term of patent 14 years

U.S. Cl. D20—41



367,079

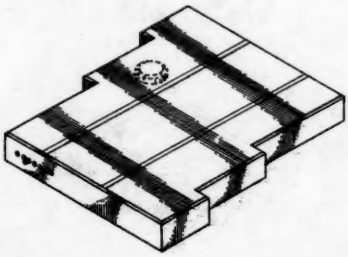
SKILL GAME

Russell M. Garrow, 210 W. 64th St., Apt. 6B, New York, N.Y. 10023

Filed Jan. 30, 1995, Ser. No. 34,179

Term of patent 14 years

U.S. Cl. D21—1



367,080

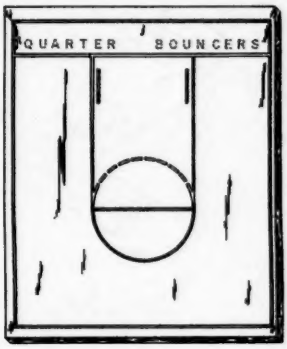
GAME BOARD

Jeffery A. Anderson, Miami, Fla., assignor to Anderson & Associates Enterprises, Inc., Miami, Fla.

Filed Aug. 31, 1992, Ser. No. 936,556

Term of patent 14 years

U.S. Cl. D21—27




367,081

COMPACT DISC INTERACTIVE PLAYER

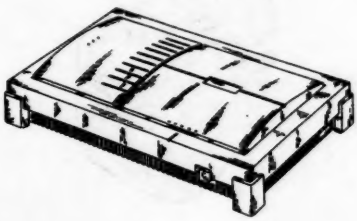
Philip Leveridge, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Sep. 9, 1994, Ser. No. 28,205

Claims priority, application Switzerland, Mar. 30, 1994, DM/029 181

Term of patent 14 years

U.S. Cl. D21—48



367,082

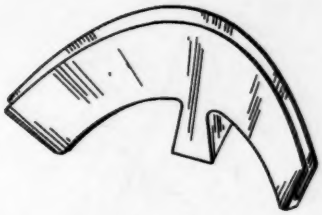
PLAYING CARD HOLDER

Peter J. Harley, PO box 5, Brunswick East, Victoria, Australia

Filed Nov. 22, 1994, Ser. No. 31,320

Term of patent 14 years

U.S. Cl. D21—54



367,083

NOVELTY PUSH-TOY

John J. Suknaic, 6548 Baywood Dr., Harrisburg, Pa. 17111

Filed Mar. 21, 1995, Ser. No. 36,471

Term of patent 14 years

U.S. Cl. D21—59

367,084

HAND-HELD FLYING TOY

Zeki Orak, P.O. Box 460517, San Francisco, Calif. 94146-0517

Filed Feb. 10, 1994, Ser. No. 18,586

Term of patent 14 years

U.S. Cl. D21—62

367,085

TOY CONTRUCTION ELEMENT

Tom Donly, 1154 Rule Hollow Rd., Sevierville, Tenn. 37862

Filed May 5, 1994, Ser. No. 22,434

Term of patent 14 years

U.S. Cl. D21—108

367,086

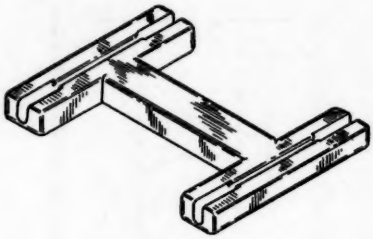
H-CONNECTOR FOR TOY CONSTRUCTION SYSTEM

Mark C. Chesler, and Fleur Chesler, both of 4535 Encino Ave., Encino, Calif. 91316

Filed Feb. 15, 1995, Ser. No. 34,879

Term of patent 14 years

U.S. Cl. D21—108



367,087

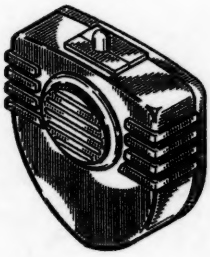
TOY FLASHLIGHT

John G. Mathews, Providence, R.I., assignor to SRL, Inc., Wilmington, Del.

Filed Jan. 27, 1995, Ser. No. 34,108

Term of patent 14 years

U.S. Cl. D21—109



367,088

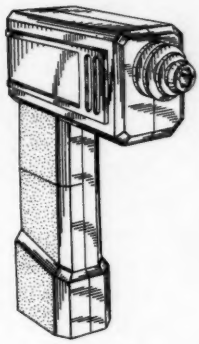
TOY POWER TOOL

Dietmar Nagel, 11 South Rd., Chester, N.J. 07930, and Craig P. Nadel, 201 Wingate Rd., Parsippany, N.J. 07054

Filed Feb. 4, 1994, Ser. No. 18,370

Term of patent 14 years

U.S. Cl. D21—120



367,089

AQUATIC EXERCISER

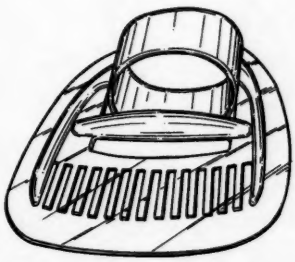
Vincent Hughes, and Angela N. Hughes, both of 34 Walu Street, Bracken Ridge Queensland, 4017, Australia

Filed Nov. 29, 1993, Ser. No. 15,798

Claims priority, application Australia, May 28, 1993, 1575/93

Term of patent 14 years

U.S. Cl. D21—191



367,090

SEAT FOR AN EXERCISER

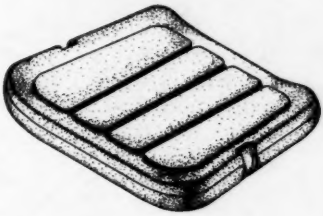
Pi-Yun Lien, Taipei Hsien, Taiwan, Prov. of China, assignor to Sun Plastic Enterprise Co., Ltd., Taipei, Taiwan, Prov. of China

Filed Nov. 8, 1994, Ser. No. 30,144

Claims priority, application Taiwan, Prov. of China, May 11, 1994, 83303692

Term of patent 14 years

U.S. Cl. D21—191



367,091

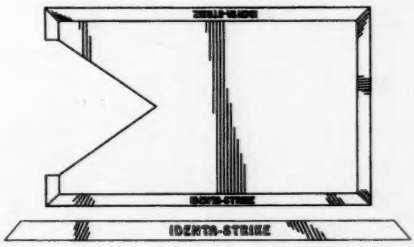
STRIKE ZONE DESIGNATING MAT FOR SLOW PITCH BASEBALL

William F. Purdy, 99 John Street, Box 1570, Blenheim, Ontario, Canada

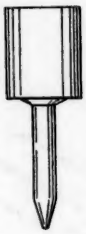
Filed Sep. 6, 1994, Ser. No. 27,993

Term of patent 14 years

U.S. Cl. D21—199

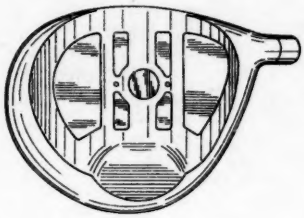


367,092
ELASTIC GOLF TEE
Floyd L. Gustine, 5631 Curry Rd., Pittsburgh, Pa. 15236
Filed Mar. 24, 1995, Ser. No. 36,684
Term of patent 14 years
U.S. Cl. D21—208



367,093
CROQUET MALLET
Robert E. Weir, P.O. Box 309, Verbena, Ala. 36091
Filed Nov. 25, 1994, Ser. No. 31,417
Term of patent 14 years
U.S. Cl. D21—210

367,094
METAL WOOD CLUB HEAD
Robert J. Williams, Jr., 40501 Clover La., Palm Desert, Calif. 92226
Filed Jan. 26, 1995, Ser. No. 34,069
Term of patent 14 years
U.S. Cl. D21—214



367,095
NOVELTY GOLF PUTTER
Andrew B. Snyder, 2420 Tangerine Dr., Sarasota, Fla. 34239
Filed Jun. 13, 1994, Ser. No. 24,336
The portion of the term of this patent subsequent to Aug. 9, 2008, has been disclaimed.
Term of patent 14 years
U.S. Cl. D21—215

367,096

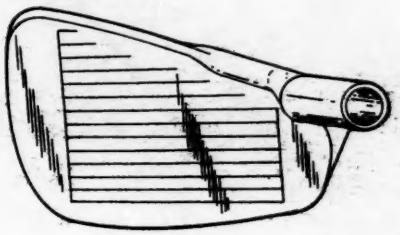
GOLF CLUB HEAD

James W. Louden, and Richard E. Louden, both of North Lewisburg, Ohio, assignors to Louden Bro's Tool Co. Inc., North Lewisburg, Ohio

Filed Mar. 7, 1994, Ser. No. 19,578

Term of patent 14 years

U.S. Cl. D21—220



367,097

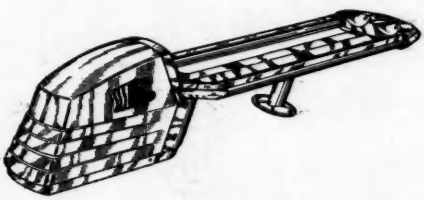
BOWLING BALL RETURN

Michael E. Stirling; Michael J. Katje, both of Spring Lake, and Piet Visser, Walker, all of Mich., assignors to Brunswick Bowling & Billiards Corporation, Muskegon, Mich.

Filed Jan. 5, 1995, Ser. No. 33,099

Term of patent 14 years

U.S. Cl. D21—233



367,098

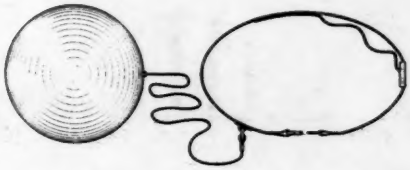
FLOAT

George L. Garrison, 5308 Sunningdale Dr., Charlotte, N.C. 28277

Filed May 12, 1995, Ser. No. 38,741

Term of patent 14 years

U.S. Cl. D21—237



367,099

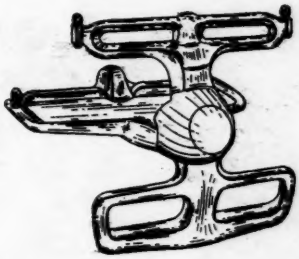
DUAL SWING SEATING PLATFORM

Russell J. Coddington, Jr., Imperial, Pa., and Robert J. Nolan, Columbus, Miss., assignors to Hedstrom Corporation, Bedford, Pa.

Filed Oct. 17, 1994, Ser. No. 29,778

Term of patent 14 years

U.S. Cl. D21—246



367,100

BUZZING FISHING LURE

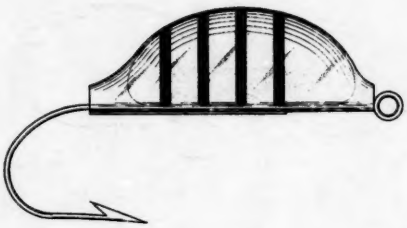
Chris A. Cahow, 1518 Monte Vista, Caldwell, Id. 83605

Continuation of Ser. No. 9,985, Jun. 28, 1993, abandoned.

This application Jun. 9, 1994, Ser. No. 24,187

Term of patent 14 years

U.S. Cl. D22—126



367,101

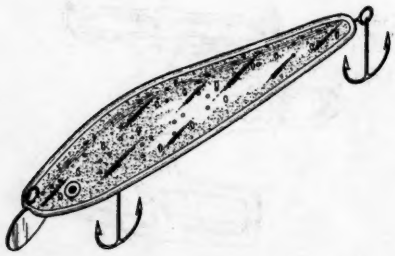
FISHING LURE

Frank P. Merolillo, 924 Hazel St., 2nd Floor, New Casstle, Pa. 16101

Filed Dec. 27, 1993, Ser. No. 16,821

Term of patent 14 years

U.S. Cl. D22—133



367,102

UPSIDE DOWN FISHING NET

Jacob D. McLeaf, Box 98, McKnightstown, Pa. 17343

Filed Mar. 10, 1995, Ser. No. 35,992

Term of patent 14 years

U.S. Cl. D22—135

367,103

FLUSHING VALVE FOR SANITARY FIXTURE

Hans Lobermeier, Menden, Germany, assignor to Friedrich Grohe Aktiengesellschaft, Hemer, Germany

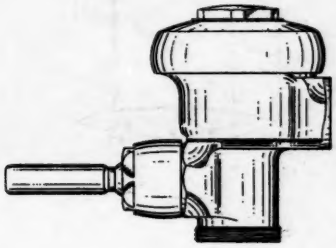
Filed Mar. 22, 1995, Ser. No. 39,091

Claims priority, application Germany, Jan. 31, 1994, M9408476.9

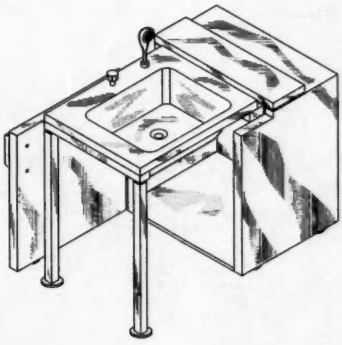
Term of patent 14 years

U.S. Cl. D23—235

367,104
FLUSH VALVE
Charles S. Allen, Kenilworth, and Jerry P. Gronwick, Park Ridge, both of Ill., assignors to Sloan Valve Company, Franklin Park, Ill.
Continuation-in-part of Ser. No. 16,734, Dec. 23, 1993, abandoned. This application Oct. 24, 1994, Ser. No. 30,218
Term of patent 14 years
U.S. Cl. D23—245



367,105
PORTABLE SINK FOR PET CARE
Dale L. Goertz, 5209 W. Nighthawk Wy., Tucson, Ariz. 85741
Filed Jun. 20, 1994, Ser. No. 24,705
Term of patent 14 years
U.S. Cl. D23—286



367,106
CHAMBER POT FOR A CHILD
Björn Jakobson, Tiby, and Håkan Bergkvist, Bromma, both of, Sweden, assignors to Baby Björn AB, Tiby, Sweden
Filed Aug. 16, 1994, Ser. No. 27,209
Claims priority, application Sweden, Feb. 18, 1994, 94-0384
Term of patent 14 years
U.S. Cl. D23—296

367,107
LAVATORY
Herbert V. Kohler, Jr., Kohler; Mary J. Reid, Sheboygan, and William C. McKeone, Sheboygan Falls, all of Wis., assignors to Kohler Co., Kohler, Wis.
Division of Ser. No. 15,122, Nov. 5, 1993, Pat. No. Des. 360,254. This application Apr. 27, 1995, Ser. No. 38,158
Term of patent 14 years
U.S. Cl. D23—292

367,108

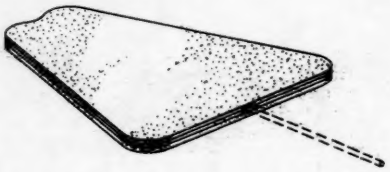
MEDICAL ELECTRODE

Jens Axelgaard, 329 W. Aviation Rd., Fallbrook, Calif. 92028-3227

Filed Jul. 18, 1994, Ser. No. 26,070

Term of patent 14 years

U.S. Cl. D24—168



367,110

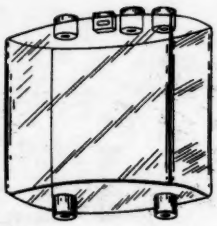
BLOOD COLLECTOR

Robert F. Cotter, 80 Seabury Point Rd., Duxbury, Mass. 02332

Filed May 19, 1994, Ser. No. 23,163

Term of patent 14 years

U.S. Cl. D24—118



367,109

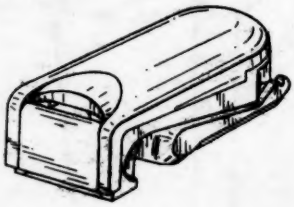
TEST STRIP HOLDER

Michael C. Ryner, Brentwood; Donna L. Savage, Campbell; Paul Montgomery, San Francisco, and Lorin P. Olson, Scotts Valley, all of Calif., assignors to LifeScan, Inc., Mountain View, Calif.

Filed Jan. 24, 1995, Ser. No. 33,963

Term of patent 14 years

U.S. Cl. D24—224



367,111

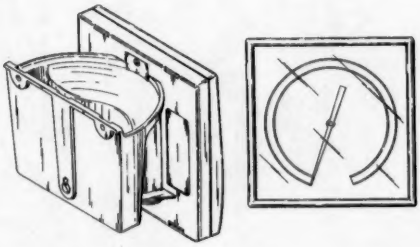
WALL-MOUNTABLE ANEROID SPHYGMOMANOMETER WITH INTEGRAL CUFF STORAGE BASKET

Edward L. Peart; Donald R. McGlone, both of Arden, N.C.; Alan S. Knieriem, Baldwinsville, and Deborah A. Laun, Syracuse, both of N.Y., assignors to Welch Allyn, Inc., Skaneateles Falls, N.Y.

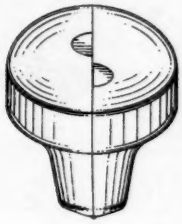
Filed Jul. 28, 1994, Ser. No. 26,474

Term of patent 14 years

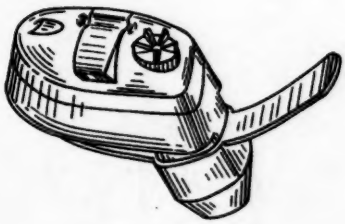
U.S. Cl. D24—166



367,112
PACIFIER COVER
Daniel Mastropierro, P.O. Box 22-3182, Hollywood, Fla. 33022
Filed Oct. 5, 1994, Ser. No. 29,418
Term of patent 14 years
U.S. Cl. D24—194

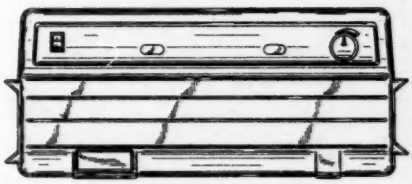


367,113
AIR CONDUCTION HEARING AID
Eric L. Weeks, Farmingdale, Me., assignor to EarCraft Technologies, Inc., Boothbay, Me.
Filed Aug. 1, 1994, Ser. No. 26,545
Term of patent 14 years
U.S. Cl. D24—174

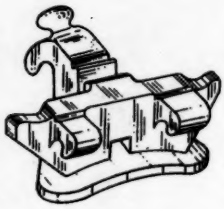


367,114
SPECIMEN SAMPLE CUP FOR USE IN AN AUTOMATIC ANALYZER
Brian Wilson, Chaska, and Ross Krogh, Waconia, both of Minn., assignors to Pasteur Sanofi Diagnostics, France
Filed Sep. 7, 1994, Ser. No. 28,113
Term of patent 14 years
U.S. Cl. D24—224

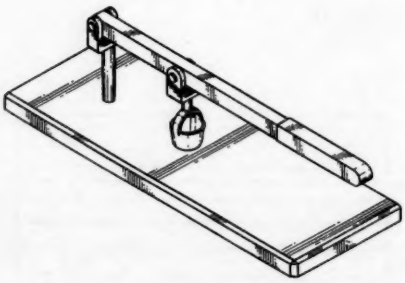
367,115
COMBINED PUMP AND INFLATION CONTROLLER FOR LIMB COMPRESSION OR PNEUMATIC MATTRESSES AND SUPPORTS
David G. Barber, Croes-Y-Ceiliog; David M. Hampson, Llandaff; John A. D. Iles, Rhiwbina, and Gregory E. Baily, Cathays, all of, United Kingdom, assignors to Huntleigh Technology PLC, Luton, United Kingdom
Filed Dec. 22, 1992, Ser. No. 2,866
Claims priority, application United Kingdom, Jun. 22, 1992, 2023761
Term of patent 14 years
U.S. Cl. D24—169



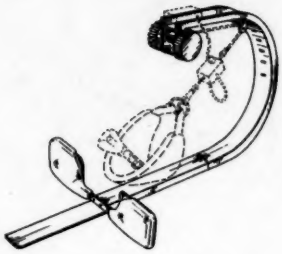
367,116
ORTHODONTIC BRACKET
Anthony D. Viazis, 8820 Southwestern Blvd., #1221, Dallas, Tex. 75206
Filed Oct. 12, 1993, Ser. No. 14,074
Term of patent 14 years
U.S. Cl. D24—180



367,117
OSTOMY CUTTER
Bobby M. Batey, 3408 Timberview Trail, Lapeer, Mich. 48446
Filed Jul. 25, 1994, Ser. No. 26,332
Term of patent 14 years
U.S. Cl. D24—147

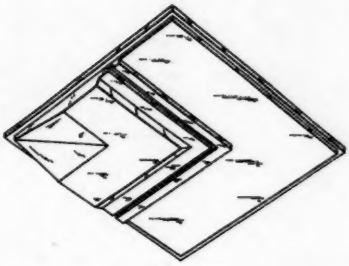


367,118
TRACTION UNIT
Forrest A. Miller, and Robert T. Cardozo, both of Seattle, Wash., assignors to Pacific Research Laboratories, Inc., Vashon, Wash.
Filed Sep. 22, 1993, Ser. No. 13,331
Term of patent 14 years
U.S. Cl. D24—188



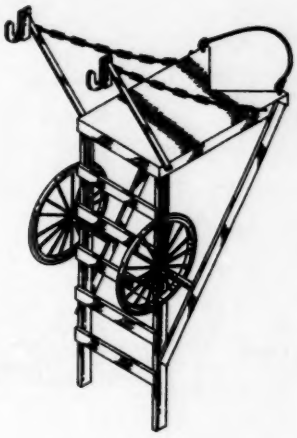
367,119
TETRAHEDRON HOUSING STRUCTURE
Gary A. Trunk, 1011 - 4th St. #212, Santa Monica, Calif. 90403
Filed Dec. 5, 1994, Ser. No. 31,737
Term of patent 14 years
U.S. Cl. D25—23

367,120
FIBERGLASS REINFORCED GYPSUM CEILING PANEL
William J. Tinen, Glenview, Ill., assignor to USG Interiors, Inc., Chicago, Ill.
Filed Dec. 16, 1994, Ser. No. 32,336
Term of patent 14 years
U.S. Cl. D25—157

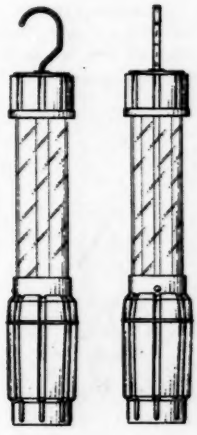


367,121
MORNING SUN TEXTURED DOOR DESIGN WITH NESTING PROFILE
Dale E. Schafernak, Palatine, Ill., assignor to Masonite Corporation, Chicago, Ill.
Filed Jun. 20, 1994, Ser. No. 24,720
The portion of the term of this patent subsequent to Feb. 6, 2010, has been disclaimed.
Term of patent 14 years
U.S. Cl. D25—48

367,122
TREE STAND
Susan L. Foster, 826 Linwood St., New Cumberland, Pa. 17070
Filed Oct. 17, 1994, Ser. No. 29,841
Term of patent 14 years
U.S. Cl. D25—62



367,123
TOP AND SIDES OF A DROP LIGHT
Bruce A. Blye, Woodland Hills, Calif., assignor to National Electric Mfg. Corp., Commerce, Calif.
Filed Oct. 3, 1994, Ser. No. 29,329
Term of patent 14 years
U.S. Cl. D26—42



367,124

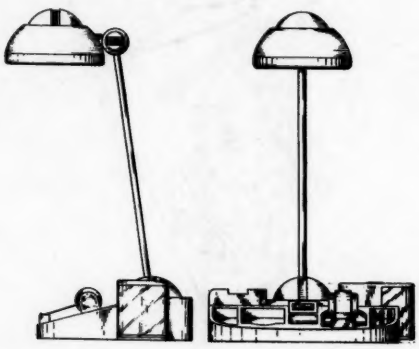
**COMBINATION LAMP AND DESKTOP ORGANIZER**

Roger N. Sherman, Jamaica Plain, Mass., assignor to Tensor Corporation, Chelsea, Mass.

Filed May 19, 1995, Ser. No. 39,385

Term of patent 14 years

U.S. Cl. D26—63



367,125

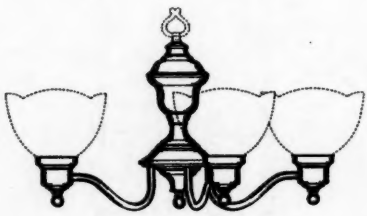
**CHANDELIER**

Patrick S. Dolan, 1901 NW. Upshur St., Portland, Oreg. 97209

Filed Dec. 19, 1994, Ser. No. 32,496

Term of patent 14 years

U.S. Cl. D26—81



367,126

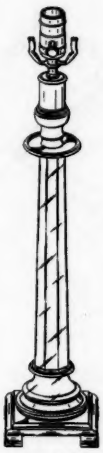
**TABLE LAMP**

John R. Drucker, Atlanta, Ga., assignor to The Speer Lamp Corp. of New York, Smyrna, Ga.

Filed Oct. 5, 1994, Ser. No. 29,419

Term of patent 14 years

U.S. Cl. D26—93



367,127

**LIGHTING SUPPORT OF CONSTANT CROSS SECTION**

Hans Staeger, Weil im Schoenbuch, Germany, assignor to Octanorm Vertriebe-GmbH fur Bauelemente, Filderstadt, Germany

Filed Dec. 9, 1993, Ser. No. 16,192

Claims priority, application Germany, Jun. 9, 1993, M 93 04 454.2

Term of patent 14 years

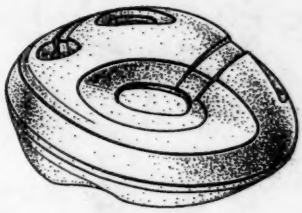
U.S. Cl. D26—138

367,128
HAIR DRYER
Leandro P. Rizzuto, Greenwich, Conn., assignor to Conair Corporation, Stamford, Conn.
Filed Aug. 15, 1994, Ser. No. 27,141
Term of patent 14 years
U.S. Cl. D28—13

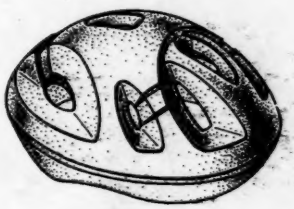
367,129
HAIR COMB
Alexandre K. de Paris, 11906-L Fair Oaks, Fair Oaks Mall, Fairfax, Va. 22033
Filed Nov. 15, 1994, Ser. No. 32,275
Term of patent 14 years
U.S. Cl. D28—28

367,130
TEETH CLEANER
Walter W. Hsu, Yinlin Hsien, Taiwan, Prov. of China, assignor to Welter's Co., Ltd., Yinlin Hsien, Taiwan, Prov. of China
Filed Sep. 9, 1994, Ser. No. 28,210
Term of patent 14 years
U.S. Cl. D28—64

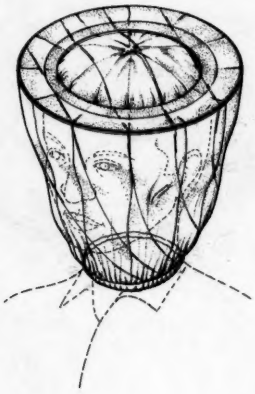
367,131
RIDER'S HELMET
Yen-Ming Jeng, 48 Feng-Lien Street, Hsin-Feng Hsian Hsinchu Hsien, Taiwan, Prov. of China
Filed Oct. 4, 1994, Ser. No. 29,369
Term of patent 14 years
U.S. Cl. D29—102



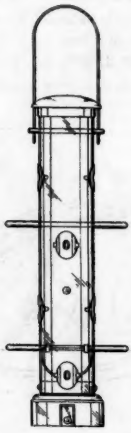
367,132
RIDER'S HELMET
Yen-Ming Jeng, 48 Feng-Lien Street, Hsin-Feng Hsian Hsinchu Hsien, Taiwan, Prov. of China
Filed Oct. 4, 1994, Ser. No. 29,370
Term of patent 14 years
U.S. Cl. D29—102



367,133
COMBINED SMOKE AND FUME SHIELD
Travis G. Roberson, Rte. 1, Box 30, De Berry, Tex. 75639
Filed Jan. 9, 1995, Ser. No. 33,293
Term of patent 14 years
U.S. Cl. D29—107

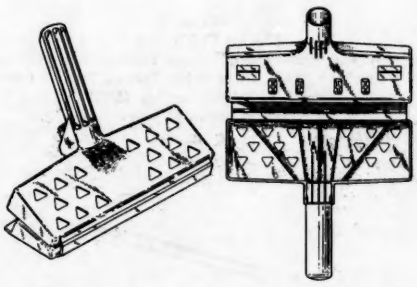


367,134
BIRD FEEDER
Robert E. Bescherer, Bristol, R.I., assignor to Aspects, Inc., Warren, R.I.
Filed Nov. 9, 1994, Ser. No. 30,815
Term of patent 14 years
U.S. Cl. D30—127



367,135
COMBINED WASHER AND DRYER
Gary B. Jackovin, Ankeny, and James R. Braunschweig, Colfax, both of Iowa, assignors to Maytag Corporation, Newton, Iowa
Filed Nov. 14, 1994, Ser. No. 30,959
Term of patent 14 years
U.S. Cl. D32—5

367,136
MOP HEAD
Mary M. Hoagland, Cincinnati, and Diana W. Juratovac, Columbus, both of Ohio, assignors to Vining Industries, Inc., Springfield, Ohio
Filed Nov. 15, 1994, Ser. No. 31,022
Term of patent 14 years
U.S. Cl. D32—44

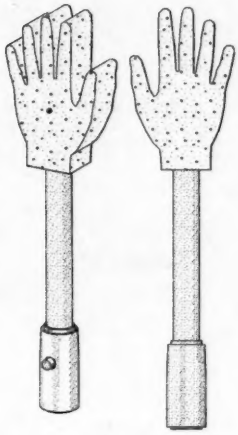


367,137

**COMBINED SPONGE AND LIQUID DISPENSER**

Steven H. Pollak, 18472 Hillcrest Ave., Villa Park, Calif. 92667, and David L. Steinberg, P.O. Box 1624, Crystal Bay, Nev. 89402-1624

Filed Jul. 20, 1993, Ser. No. 10,903
Term of patent 14 years
U.S. Cl. D32—45



367,138

**IRON**

Ignacio O. Laborda, Eibar, Spain, assignor to Officina De Investigacion Agrupada, S.A., Eibar, Spain

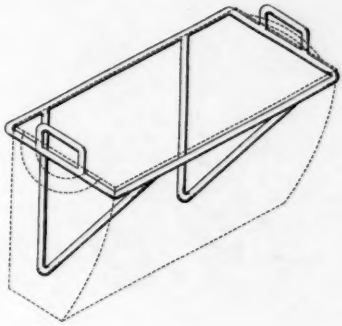
Filed May 27, 1994, Ser. No. 23,610
Claims priority, application Spain, Nov. 30, 1993, 131442
Term of patent 14 years
U.S. Cl. D32—70

367,139

**SUPPORT FRAME FOR BAGS WITH HANDLES**

David E. Brown, 279 Terrace Trail W., Lake Quivira, Kans. 66106

Filed Apr. 1, 1994, Ser. No. 20,803
Term of patent 14 years
U.S. Cl. D34—5

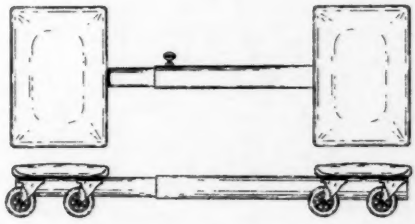


367,140

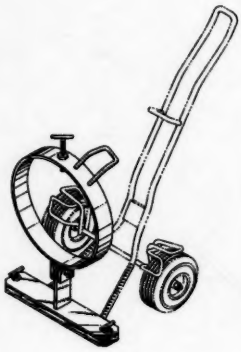
**ADJUSTABLE PALLET**

Darrel Reese, 10929 Firestone Blvd., Suite 187, Norwalk, Calif. 90650

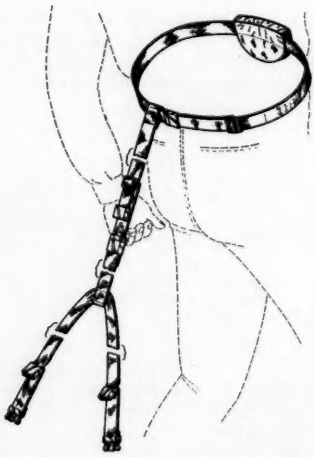
Filed May 12, 1995, Ser. No. 38,872
Term of patent 14 years
U.S. Cl. D34—23



367,141
DRUM HANDLER
David W. Suggs, Aquilla, and Donald R. Suggs, Sr., Denton, both of Tex., assignors to Tire Shuttle, Inc., Elm Mott, Tex.
Filed Nov. 4, 1994, Ser. No. 30,691
Term of patent 14 years
U.S. Cl. D34—27

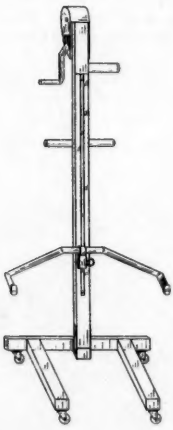


367,142
BODY HARNESS FOR TOWING
Chester G. Platt, 510 Oakwood Ave., Lancaster, Ohio 43130
Filed Dec. 27, 1994, Ser. No. 32,714
Term of patent 14 years
U.S. Cl. D34—27



367,143
CABLE STRINGING ROLLER DEVICE
Charles J. Sauber, 10 N. Sauber Rd., Virgil, Ill. 60182
Filed Mar. 10, 1995, Ser. No. 36,023
Term of patent 14 years
U.S. Cl. D34—29

367,144
SIXTY QUART INSTITUTIONAL MIXER BOWL BREAKDOWN HOIST
Berta Poskocil, 903 Pineknot La., and Elmer Redwine, 920 Cooterneck Rd., both of Heber Springs, Ark. 72543
Filed Apr. 18, 1994, Ser. No. 21,458
Term of patent 14 years
U.S. Cl. D34—33



367,145

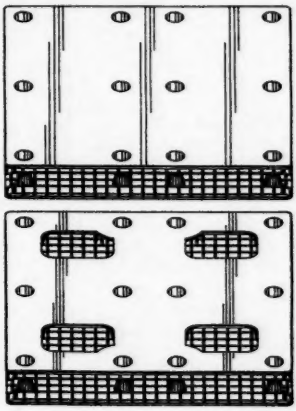
PLASTIC PALLET

Bill E. Hamilton, 28439 Great River Rd., Princeton, Iowa 52768

Filed Nov. 25, 1994, Ser. No. 32,074

Term of patent 14 years

U.S. Cl. D34—38



367,146

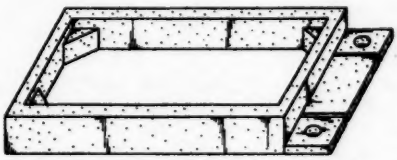
STONE SURROUND FOR DEFINING A GRAVE SITE

Jang P. Ha, 8459 Brass Knob Ct., Annandale, Va. 22003

Filed Apr. 29, 1994, Ser. No. 22,078

Term of patent 14 years

U.S. Cl. D99—20



367,147

CRUCIFIX

Robert Broussard, 908 Cranbrook Ave., Torrance, Calif. 90503

Filed Oct. 27, 1994, Ser. No. 30,368

Term of patent 14 years

U.S. Cl. D99—27

367,148

SCRIP MACHINE

Ralph H. Clinard, Houston, Tex., assignor to Cardpro, Inc., Houston, Tex.

Filed Apr. 13, 1995, Ser. No. 37,503

Term of patent 14 years

U.S. Cl. D99—28

367,149

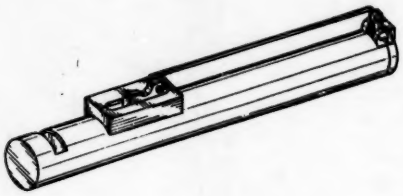
**TOLL COIN DISPENSER**

Jeffery Jones, 175 Prospect St., Suite 9K, East Orange, N.J. 07017

Filed Jun. 21, 1994, Ser. No. 24,797

Term of patent 14 years

U.S. Cl. D99—34



367,150

**BANK DRIVE THROUGH UNIT**

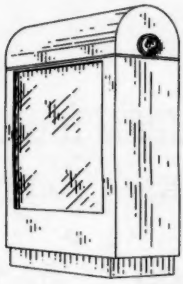
George Ragan, Alexander, Ark., assignor to Retail Display Corporation, Little Rock, Ark.

Filed Aug. 2, 1994, Ser. No. 26,627

The portion of the term of this patent subsequent to Jul. 4, 2009, has been disclaimed.

Term of patent 14 years

U.S. Cl. D99—35



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TO WHOM

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Bauer, Friedhelm; and Streit, Peter, 5,491,351, Cl. 257-152.000.

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Ellis, Roy D.; and Maurath, Steven E., 5,491,740, Cl. 379-58.000.

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Tokiwa, Toru; and Hasegawa, Takayoshi, 5,490,752, Cl. 414-280.000.

Amano, Takehiro: *See*—
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Kreuzenztein, Ronald K.; Vongnechten, Mark; and Wong, Kai C., 5,491,799, Cl. 395-200.080.

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Knight, Robert J.; and Highwood, David P., 5,491,160, Cl. 514-384.000.
Seddon, Andrew P.; Li, Luyuan; Böhlen, Peter; Eisinger, Magdalena; and Yayon, Avner, 5,491,220, Cl. 530-399.000.

American Fence Corp: *See*—
Shumway, Paul W., 5,490,694, Cl. 285-305.000.

American Home Products Corporation: *See*—
Malamas, Michael S., 5,491,159, Cl. 514-374.000.
Nelson, Frances C.; and Schichser, Guy A., 5,491,231, Cl. 540-456.000.

American Magnetics Corporation: *See*—
Saroya, Jagtar S., 5,491,327, Cl. 235-449.000.

American Maize Technology, Inc.: *See*—
Wermers, Vilas; and Romanovich, Michael, 5,490,875, Cl. 106-208.000.

Amir, Yoel: *See*—
Kreitman, Haim; Bar-El, Dan; Amir, Yoel; and Tirosh, Ehud, 5,491,517, Cl. 348-581.000.

Amoco Corporation: *See*—
Kraemer, Mark S.; and Ratliff, James A., 5,491,637, Cl. 364-468.000.

Analytical Technology, inc.: *See*—
Mattson, David R., 5,491,551, Cl. 356-346.000.

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Spaltro, Suree M.; Ananthapadmanabhan, Kavssery; Aronson, Michael P.; and Frushour, Michael, 5,490,978, Cl. 424-49 000.

Anchor Wall Sytems, Inc.: *See*—
Woolford, Michael E., 5,490,363, Cl. 52-604.000.

Ancona, Bruce; and Kilduff, Edward H., to B. Via International Housewares, Inc. Foodstuff treating device. 5,490,454, Cl. 99-510.000.

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Andes, Richard L.: *See*—
Kerdiya, Nidai; and Andes, Richard L., 5,491,419, Cl. 324-418.000.

Ando Electric Co., Ltd.: *See*—
Kitamura, Atsushi, 5,491,714, Cl. 372-92.000.
Uehara, Takafumi; and Dehara, Masayoshi, 5,491,440, Cl. 327-172.000.
Ando, Mari H.: *See*—
Stowell, Davin B.; Ando, Mari H.; and Sica, Vanessa D., 5,490,616, Cl. 222-472.000.
Ando, Shoichi; Doi, Yoshihisa; and Otsubo, Makoto, to Honda Giken Kogyo Kabushiki Kaisha. Method of and apparatus for extruding a billet of a light metal alloy. 5,490,408, Cl. 72-256.000.
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Yamamoto, Tomoaki; and Andou, Manabu, 5,490,541, Cl. 138-118.100.
Andrews, Jeffrey F.; and Munson, Janet F., to Minnesota Mining and Manufacturing Company. Disinfectant composition. 5,490,992, Cl. 424-606.000.
Andrews, John T.: *See*—
Warner, Donald B.; Andrews, John T.; Menke, Mark D.; Cooperman, Marc A.; and Tornes, Jan, 5,490,581, Cl. 187-414.000.
Andrews, Walter R.: *See*—
Maiocco, Richard P., Sr., 5,491,466, Cl. 340-467.000.
Ang, Sotero A.: *See*—
Daigle, Lyman R.; Ledesma, Andrew C.; and Ang, Sotero A., 5,491,379, Cl. 313-509.000.
Angstadt, Howard P.; Hollstein, Elmer J.; and Hsu, Chao-Yang, to Sun Company, Inc. (R&M). Alkylation process using solid superacid catalyst liquid phase. 5,491,278, Cl. 585-731.000.
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Uzgiris, Egidijus E.; Opsahl, Lorinda R.; Vosburgh, Kirby G.; Anthony, Thomas R.; and Cline, Harvey E., 5,490,840, Cl. 604-22.000.
Anticancer Incorporated: *See*—
Monosov, Ann; and Fu, Xinyu, 5,491,284, Cl. 800-2.000.
Antkowiak, Thomas A.: *See*—
Lawson, David F.; Antkowiak, Thomas A.; Hall, James E.; and Stayer, Mark L., Jr., 5,491,230, Cl. 540-450.000.
Aoki, Tadao; and Miyakoshi, Hideo, to Ajinomoto Co., Inc. Supplementary therpeutic agents for the treatment of immunodeficiency syndrome. 5,491,150, Cl. 514-310.000.
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Kuzuya, Keiji; Nakahara, Naoji; and Aoki, Yasuyuki, 5,491,648, Cl. 364-565.000.
Apex Engineering Company: *See*—
Taylor, Kenneth D., 5,491,320, Cl. 219-137.410.
Apogee, Jon: *See*—
Dixon, Michael; Hudson, James B.; and Apogee, Jon, 5,490,621, Cl. 224-319.000.
Apple Computer, Inc.: *See*—
Clark, Michael R.; Kay, Alan C.; and Ferrara, Thomas, 5,491,477, Cl. 341-20.000.
Applied Chemical Solutions, Inc.: *See*—
Bernosky, Eugene W.; Geatz, J. Tobin; Ferrie, Edward T., Jr.; and Roberson, Glenn A., Jr., 5,490,611, Cl. 222-1.000.
Applied Materials, Inc.: *See*—
Birang, Manoocher; Ding, Jian; and Levinstein, Hyman J., 5,491,603, Cl. 361-234.000.
Applied Research Systems ARS Holding NV: *See*—
Puyol, Manuel R.; and Puyol, Diego R., 5,491,131, Cl. 514-14.000.
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Kitayama, Tadashi; and Onishi, Ichiro, 5,490,685, Cl. 280-47.380.
Araco Kabushiki Kaisha: *See*—
Akizuki, Kenichiro; Suenaga, Hiroharu; and Hayashi, Masaki, 5,490,718, Cl. 297-452.490.
Araki, Hidefumi: *See*—
Kataoka, Yoshiyuki; Murase, Michio; Araki, Hidefumi; and Iwata, Yasutaka, 5,491,730, Cl. 376-283.000.
Aramaki, Junichi; and Kihara, Nobuyuki, to Sony Corporation. Method of and apparatus for reproducing a recording medium. 5,491,592, Cl. 360-59.000.
Aramaki, Matsumi; Isobe, Yasukazu; and Toyokawa, Tetsune, to International Business Machines Corporation. Data processing apparatus and control circuit unit connected thereto. 5,491,789, Cl. 395-183.010.
Arbues, Jose L. A. Winch construction for cargo tie-down straps. 5,490,749, Cl. 410-103.000.
Arch Development Corporation: *See*—
Zhang, Wei; and Doi, Kunio, 5,491,627, Cl. 364-413.200.
Archibald, James B.: *See*—
Moller, David D.; and Archibald, James B., 5,491,445, Cl. 327-540.000.
Archibald, Kenneth R., to Hayes Wheels International, Inc. Vehicle wheel having a tinnerman nut clearance groove. 5,490,720, Cl. 301-35.620.
Arentzen, Rene; Jadhav, Prabhakar K.; Kobos, Robert K.; and Smart, Bruce E., to Du Pont de Nemours, E. I., and Company. Immobilization of biomolecules on a fluorocarbon surface with a poly(fluoroalkyl) sugar reagent. 5,491,083, Cl. 435-181.000.
Ariizumi, Masahito: *See*—
Mase, Tomokazu; Murata, Yoshiyuki; Ariizumi, Masahito; and Sato, Shinichiro, 5,491,777, Cl. 395-133.000.
Ariki, Yoshio: *See*—
Yamasaki, Futoshi; Ariki, Yoshio: Deguchi, Masaharu; Kakuda, Takashi; Hisada, Takanori; and Maruyama, Takesuke, 5,491,525, Cl. 353-98.000.
Arimilli, Ravi K.; Dhawan, Sudhir; and Siegel, David W., to International Business Machines Corporation. Cache system using mask bits to recorder the sequences for transfers of data through cache to system memory. 5,491,811, Cl. 395-471.000.
Ariyoshi, Hayato: *See*—
Nasu, Rikuo; Hamaguchi, Motohiko; and Ariyoshi, Hayato, 5,491,239, Cl. 546-345.000.
Armentrout, Charles, to Pilot Industries, Inc. Soft x-ray imaging device. 5,491,331, Cl. 250-214.0VT.
Armor, John N.: *See*—
Ford, Michael E.; and Armor, John N., 5,491,199, Cl. 525-362.000.
Arndt, Douglas J.: *See*—
Thiele, Charles W.; Willemstyn, Tunis J.; Arndt, Douglas J.; and McMullen, John J., 5,490,745, Cl. 406-132.000.
Arnold, Kenneth E., to Paragon Engineering Services Incorporated. Subsea flow enhancer. 5,490,562, Cl. 166-267.000.
Arnold, Timothy C.; and Mehaffey, Robert E., Jr., to Witco Corporation. Quaternary compound of a tertiary amine and methyl chloride. 5,491,240, Cl. 548-347.100.
Arntz, Robert T., to Chrysler Corporation. Circuit for detecting a short circuit in a low side driven load. 5,491,601, Cl. 361-79.000.
Aronson, Michael P.: *See*—
Spaltro, Suree M.; Ananthapadmanabhan, Kavssery; Aronson, Michael P.; and Frushour, Michael, 5,490,978, Cl. 424-49.000.
Artrip, Sharon G.: *See*—
Adamczyk, Maciej; Chen, Yon-Yih; Walling, John A.; James, Bryan D.; and Artrip, Sharon G., 5,491,071, Cl. 435-25.000.
Arya, Shish P. S.: *See*—
Sarin, Vinod K.; and Arya, Shish P. S., 5,491,028, Cl. 428-408.000.
Asahi Kogaku Kogyo Kabushiki Kaisha: *See*—
Iwaki, Makoto; Maruyama, Koichi; and Iki, Makoto, 5,491,587, Cl. 359-641.000.
Ogawa, Ryota; and Kato, Hiroyuki, 5,491,588, Cl. 359-676.000.
Asahi TEC Corporation: *See*—
Asai, Shigesaburo; and Sakagami, Tetsuya, 5,491,030, Cl. 428-433.000.
Asai, Shigesaburo; and Sakagami, Tetsuya, to Asahi TEC Corporation. Surface finishing for metal moldings. 5,491,030, Cl. 428-433.000.
Asano, Shinya, to Canon Kabushiki Kaisha. Recording apparatus and method of ink sheet type determination. 5,490,733, Cl. 400-223.000.
Asar, Madhu P.; and Maddox, Harry L., to AT&T Corp. System for measuring contamination resistance. 5,491,424, Cl. 324-715.000.
ASC Incorporated: *See*—
Rahn, Brian, 5,490,709, Cl. 296-122.000.
Asea Brown Boveri Ltd.: *See*—
Althaus, Rolf; and Schulte-Werning, Burkhard, 5,490,388, Cl. 60-737.000.
Asgar, Kamal: *See*—
Fountain, Richard W.; and Asgar, Kamal, 5,490,870, Cl. 75-255.000.
Ashbrook, Clifford L., to Quinetics Corporation. Bullet puller. 5,490,313, Cl. 29-275.000.
Ashida, Yasuko: *See*—
Miyake, Akio; Kawano, Yasuhiko; and Ashida, Yasuko, 5,491,145, Cl. 514-248.000.
Ashmore, Benjamin H., Jr., to Texas Instruments Incorporated. On-chip operation control for memories. 5,491,660, Cl. 365-230.020.
Askin, David; Volante, Ralph P.; and Eng, Kan K., to Merck & Co., Inc. Process for making HIV protease inhibitors. 5,491,238, Cl. 546-270.000.
Assel, Mark; and Whetsel, James E., to Erico International Corporation. Mixture of reactants for use in welding. 5,490,888, Cl. 149-37.000.
Associated Universities, Inc.: *See*—
Stoutenburgh, Roger R., 5,491,345, Cl. 250-506.100.
Veligdan, James T., 5,491,470, Cl. 340-825.310.
Astec Industries, Inc.: *See*—
Gray, William R., 5,490,635, Cl. 241-101.760.
AT&T Bell Corp.: *See*—
Bartlett, Charles S.; Benning, Roger D.; Hunter, John B.; Sanford, Charles; and Zuniga, Michael A., 5,491,747, Cl. 379-433.000.
AT&T Corp.: *See*—
Asar, Madhu P.; and Maddox, Harry L., 5,491,424, Cl. 324-715.000.
Belove, Edward; Culbert, James A.; Johnson, R. Patrick; Heath, David M.; Kraley, Michael F.; Méndez, Deborah; Pant, Sangam; and Zagieboylo, Stephen, 5,491,820, Cl. 395-600.000.
Bergano, Neal S., 5,491,576, Cl. 359-156.000.
Coyne, James C.; LaGrotta, Richard T.; Magnotti, Frank A.; and Turbiak-Magnotti, Frances, 5,490,436, Cl. 74-573.00F.
Farwell, Charles Y.; Miller, Richard D.; and Windhausen, Richard A., 5,491,741, Cl. 379-59.000.
AT&T Global Information Solutions Company: *See*—
Gasparik, Frank, 5,491,429, Cl. 326-27.000.
Atkinson, John A. Method and apparatus for detecting refrigerant leaks. 5,490,413, Cl. 73-40.000.
ATM Machining Inc.: *See*—
Richardson, Orland W.; and Gerdeman, Roger J., 5,490,456, Cl. 101-35.000.
Atsumi, Akira: *See*—
Kyushima, Hiroyuki; Nagura, Koji; Hasegawa, Yutaka; Kawano, Eiichiro; Kuroyanagi, Tomihiko; Atsumi, Akira; and Mizuide, Masuya, 5,491,380, Cl. 313-533.000.
Atsuta, Yuzuru. Pressure-discharged type retaining system. 5,490,443, Cl. 92-27.000.
Auburn, David M. Cot. 5,490,292, Cl. 5-8.000.

Auburn University: *See*—
Worley, Shelby D.; Sun, Gang; Sun, Wanying; and Chen, Tay-Yuan, 5,490,983, Cl. 424-405.000.

Aulanko, Esko; Mustalahti, Jorma; and Hakala, Harri, to Kone Oy. Structure for attaching elevator machinery in a building. 5,490,578, Cl. 187-254.000.

Auld, Frederick H., Jr.; and Long, Michael E., to Zenith Electronics Corporation. Enhanced security for a cable system. 5,491,748, Cl. 380-15.000.

Aust, John A.: *See*—
Malone, Kevin J.; Hayden, Joseph S.; Sanford, Norman A.; and Aust, John A., 5,491,708, Cl. 372-41.000.

Austin, John S., to International Business Machines Corp. Compensated CMOS driver circuit with reduced DC losses. 5,491,436, Cl. 327-108.000.

Aversa, Piero; Ives, David C.; Minger, Hajnal; Ojala, William K.; and Zeiser, Philip R., to Ford Motor Company. Internal combustion engine intake manifold with integral EGR cooler and ported EGR flow passages. 5,490,488, Cl. 123-570.000.

Avery Dennison Corporation: *See*—
Coward, Roderick T.; and Whipp, Andrew H., 5,490,658, Cl. 248-683.000.
Enlow, Howard H.; Huffer, Scott W.; Young, Frederick; and Buehne, William J., 5,490,893, Cl. 156-230.000.

Awbrey, Brian J.; and Dye, Kipp K. Water therapy and fitness device. 5,490,823, Cl. 482-55.000.

Axford, J. Paul: *See*—
Yarnall, Ransom A.; Axford, J. Paul; and Thayer, Dale D., 5,491,737, Cl. 378-58.000.

Ayorinde, Folahan O.; and Hassan, Mahmoud, to Howard University. Acrylate ester. 5,491,244, Cl. 549-561.000.

Azarbarzin, Kurt: *See*—
Person, Wayne C.; Theroux, Marc J.; Azarbarzin, Kurt; and Granger, Richard N., 5,490,856, Cl. 606-139.000.

Azer, Samir N.; and Krause, William R. Orthopedic awl. 5,490,852, Cl. 606-79.000.

Azionaria Costruzioni Macchine Automatiche A.C.M.A. S.p.A.: *See*—
Spatafora, Mario, 5,490,368, Cl. 53-234.000.

Azoulay, David: *See*—
Pri-Bar, Ilan; Azoulay, David; and Buchman, Ouri, 5,490,919, Cl. 208-262.100.

Azuma, Mituhiro, to NEC Corporation. Static random access memory device having thin film transistor loads. 5,491,654, Cl. 365-156.000.

B. Via International Housewares, Inc.: *See*—
Ancona, Bruce; and Kilduff, Edward H., 5,490,454, Cl. 99-510.000.

Babaz, Michel: *See*—
Marcel, Robert; and Babaz, Michel, 5,490,538, Cl. 137-357.000.

Babcock & Wilcox Company, The: *See*—
Flora, John H.; and Whaley, Hubert L., 5,491,409, Cl. 324-242.000.

Babin, James E.; and Whiteker, Gregory T., to Union Carbide Chemicals & Plastics Technology Corporation. Asymmetric syntheses. 5,491,266, Cl. 568-449.000.

Babuder, Gerald A.: *See*—
Fisher, Ronald K.; Babuder, Gerald A.; and Doty, David L., 5,490,693, Cl. 285-92.000.

Baby Bjorn AB: *See*—
Bergqvist, Håkan, 5,490,620, Cl. 224-160.000.

Bach, Katherine M., personal representative: *See*—
Schaefer, Donald W., deceased; and Siedband, Melvin P., 5,490,520, Cl. 128-848.000.

Bachmann, Torben L.: *See*—
Manker, Denise C.; Rosendahl, Connie N.; Heide, Morten; Bachmann, Torben L.; and Nielsen, Ruby I., 5,491,122, Cl. 504-100.000.

Backes, Thomas W.; Dingman, Sean D.; and Verrett, Sheldon P., to Monsanto Company. Block detergent containing nitrilotriacetic acid. 5,490,949, Cl. 252-174.000.

Bae, Hyoung K.: *See*—
Lee, Eun Y.; and Bae, Hyoung K., 5,491,378, Cl. 313-506.000.

Bae, Myung-Ho: *See*—
Mun, Zin-Suk; and Bae, Myung-Ho, 5,491,435, Cl. 327-55.000.

Baer, Samuel C.: *See*—
Kaiser, H. Paul; Mosley, Ellen; Baer, Samuel C.; and Bononcini, Kenneth, 5,491,016, Cl. 428-198.000.

Bagchi, Pranab: *See*—
Van Meter, James P.; Bagchi, Pranab; Thomas, Brian; and Rosiek, Thomas A., 5,491,052, Cl. 430-545.000.

Bagley, Steven C.: *See*—
Withgott, M. Margaret; Bagley, Steven C.; Bloomberg, Dan S.; Halvorsen, Per-Kristian; Huttenlocher, Daniel P.; Cass, Todd A.; Kaplan, Ronald M.; and Rao, Ramana R., 5,491,760, Cl. 382-203.000.

Bahr, Allen A.; Nguyen, Du V.; and Teichman, Gary A., to International Business Machines Corporation. Start up circuit for continuous sine-wave commutated brushless motors. 5,491,391, Cl. 318-39.000.

Bailey, David C.; and Martin, Carl A., to Cybor Corporation. Dual stage pump system with pre-stressed diaphragms and reservoir. 5,490,765, Cl. 417-2.000.

Bailey Marketing Group, Inc.: *See*—
Lane, William F.; and Williams, Robert C., 5,490,609, Cl. 220-712.000.

Bailey, Peter L.: *See*—
Richardson, Norman K.; Schilling, Kurt M.; Pocalyko, David J.; and Bailey, Peter L., 5,490,980, Cl. 424-94.600.

Bailey, Terry R.: *See*—
Tolliver, Howard R.; and Bailey, Terry R., 5,491,021, Cl. 428-217.000.

Baillargeon, David J.; Cardis, Angeline B.; and Heck, Dale B., to Mobil Oil Corporation. Multifunctional additives to improve the low-temperature properties of distillate fuels and compositions thereof. 5,490,863, Cl. 44-331.000.

Bair, James A.: *See*—
Whitlock, Michael B.; Bair, James A.; and Nakayama, Hidenori, 5,490,868, Cl. 55-503.000.

Baker, Dwight, to Total Tool, Inc. Casing seal and spool for use in fracturing wells. 5,490,565, Cl. 166-379.000.

Baker Hughes Incorporated: *See*—
Wu, Jian-Qun, 5,491,488, Cl. 343-719.000.

Baker, Kevin J.: *See*—
Myers, W. Neill; Shadoan, Michael D.; Forbes, John C.; Baker, Kevin J.; and Rice, Darron C., 5,490,831, Cl. 602-26.000.

Baker, Raymond L. Cylindrical thread cutting aid. 5,490,746, Cl. 408-123.000.

Bakhshi, Shiv K.; Williams, Steven H.; Scott, James W.; Haines, Randall M.; and McGrath, Ralph D., to Owens-Corning Fiberglas Technology, Inc. Method for manufacturing a mineral fiber product. 5,490,961, Cl. 264-6.000.

Bakker, Johan P.: *See*—
Concannon, David J.; Copenhaver, Gary B.; Bakker, Johan P.; Catchpole, Clive E.; and Vala, John D., 5,491,336, Cl. 250-228.000.

Bala, Gregory A.; and Thomas, Charles P., to Lockheed Idaho Technologies Company. Apparatus for removing hydrocarbon contaminants from solid materials. 5,490,531, Cl. 134-109.000.

Baldwin Filters, Inc.: *See*—
Krull, Timothy L., 5,490,930, Cl. 210-443.000.

Bales, Stephen E.: *See*—
Martin, Patrick H.; Bales, Stephen E.; Kim, Peter K.; and Wessling, Ritchie A., 5,490,967, Cl. 264-322.000.

Ball Corporation: *See*—
English, Thomas C., 5,491,451, Cl. 331-3.000.

Balloni, Riccardo: *See*—
Tsai, Mingliang L.; and Balloni, Riccardo, 5,491,023, Cl. 428-349.000.

Balzers AG: *See*—
Bracher, Bernhard, 5,490,915, Cl. 204-298.180.

Balzers Aktiengesellschaft: *See*—
Schertler, Roman; Haag, Walter; and Kohler, Peter, 5,490,913, Cl. 204-298.200.

Bamford, Jeffrey: *See*—
Tracy, Lawrence R.; Eggers, Frederick W.; Houston, David; Wallace, Walter B.; and Bamford, Jeffrey, 5,491,467, Cl. 340-522.000.

Bannai, Kenji: *See*—
Niimura, Koichi; Kawabe, Takako; Wada, Tsutomu; Saitoh, Tsuyoshi; and Bannai, Kenji, 5,491,138, Cl. 514-182.000.

Banzi, Viviano: *See*—
Tanaglia, Tiziano; Banzi, Viviano; and Zecchi, Elisa, 5,491,208, Cl. 526-143.000.

Barbe, Gerard: *See*—
Rebours, Claude; and Barbe, Gerard, 5,490,418, Cl. 73-161.000.

Barber, Gary N.; Greco, Patricia R.; Bogdanowicz, Mitchell J.; and Kelly, Elizabeth L., to Eastman Kodak Company. Chromogenic black-and-white motion picture film. 5,491,053, Cl. 430-549.000.

Barber, Loren L., Jr.: *See*—
Pihl, Richard M.; Hayes, Duane J.; Barber, Loren L., Jr.; Welygan, Dennis G.; Hardwick, R. Eugene; Zemke, Ronald O., deceased, 5,491,025, Cl. 428-373.000.

Bar-El, Dan: *See*—
Kreitman, Haim; Bar-El, Dan; Amir, Yoel; and Tirosh, Ehud, 5,491,517, Cl. 348-581.000.

Barhen, Jacob; Toomarian, Nikzad; Fijany, Amir; and Zak, Michail, to California Institute of Technology. High precision computing with charge domain devices and a pseudo-spectral method therefor. 5,491,650, Cl. 364-606.000.

Barnaby, Catherine L.; Gammack, Richard J.; and Stansfield, Anthony I., to SGS-Thomson Microelectronics Ltd. Cam with additional row cells connected to match line. 5,491,703, Cl. 371-40.100.

Barnhart, Eric N.: *See*—
Pickering, Leslie W.; Barnhart, Eric N.; Harvey, Bruce A.; and Witten, Michael L., 5,491,644, Cl. 364-514.00R.

Baron, Bruce M.: *See*—
Salituro, Francesco G.; and Baron, Bruce M., 5,491,153, Cl. 514-339.000.

Barr, Christopher P. Apparatus for configuring multiple compartments. 5,490,705, Cl. 296-24.200.

Barrett, David M.: *See*—
Ward, Jean R.; Barrett, David M.; Martin, Patricia A.; and Mokoski, Christopher D., 5,491,495, Cl. 345-173.000.

Bartell, Robert J.; and Kern, Calvin V., to Eaton Tennessee, Inc. Anti-lock brake system with motor and gear pump assembly. 5,490,721, Cl. 303-116.400.

Bartlett, Charles S.; Benning, Roger D.; Hunter, John B.; Sanford, Charles; and Zuniga, Michael A., to AT&T Bell Corp. Noise-cancelling telephone handset. 5,491,747, Cl. 379-433.000.

Bartlett, Niall M.: *See*—
Koyama, Ryo; and Bartlett, Niall M., 5,491,498, Cl. 345-190.000.

Bartley, Robert M.; Conway, Michael E.; and Millard, Harry J., III, to General Motors Corporation. Halo lighting for keypad switch assemblies. 5,491,313, Cl. 200-310.000.

BASF Aktiengesellschaft: *See*—
Dix, Johannes P.; Baus, Ulf; Beck, Karin H.; and Raulfs, Friedrich-Wilhelm, 5,491,043, Cl. 430-110.000.
Grabowski, Sven; Kah-Helbig, Astrid; Sanner, Axel; and Wendel, Kurt, 5,490,990, Cl. 424-486.000.
Hagen, Helmut; Nilz, Gerhard; Roetsch, Thomas; Walter, Helmut; and Landes, Andreas, 5,491,123, Cl. 504-104.000.
Langhauser, Franz; Kerth, Jürgen; Schweier, Günther; Brintzinger, Hans-Herbert; Mansel, Stefan; Roell, Werner; and Kirsten, Robin, 5,491,205, Cl. 526-121.000.
Patsch, Manfred; and Schefczik, Ernst, 5,491,232, Cl. 544-3.000.
BASF Corporation: *See*—
Narayan, Thirumurti; Lovell, David J.; and Lopez, Carlos H., 5,491,252, Cl. 560-26.000.
BASF Magnetics GmbH: *See*—
Veitch, Ronald J.; Jakusch, Helmut; and Heilmann, Peter, 5,490,476, Cl. 116-217.000.
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Wang, Hann-Ping; and Liu, Cheng-Ming, 5,490,909, Cl. 204-452.000.
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Beight, Douglas W.: *See*—
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Bekele, Solomon, to W. R. Grace & Co.-Conn. Amorphous nylon composition and films. 5,491,009, Cl. 428-35.700.
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Bennin, Jeffry S.; Boucher, Todd; Green, Jeffrey W.; Gustafson, Gary E.; Jurgenson, Ryan; and Lien, Brent D., to Hutchinson Technology Incorporated. Gimbal flexure and electrical interconnect assembly. 5,491,597, Cl. 360-104.000.
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Berger, Jacob; and Clark, Robin D., to Syntex (U.S.A.) Inc. Isoquinolinone and dihydroisoquinolinone 5-$HT_3$ receptor antagonists. 5,491,148, Cl. 514-305.000.
Berger, Johann; and Simon, Burkhard, to MTU Motoren- und Turbinen-Union Muenchen GmbH. Gas turbine combustor. 5,490,378, Cl. 60-39.230.
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Bernosky, Eugene W.; Geatz, J. Tobin; Ferrie, Edward T., Jr.; and Roberson, Glenn A., Jr., to Applied Chemical Solutions, Inc. Process for precise volumetric diluting/mixing of chemicals. 5,490,611, Cl. 222-1.000.
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Beuch, Donald: *See—*
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Bianco, Thomas A., Sr. Hand brake lever lock. 5,490,403, Cl. 70-202.000.
Bibbe, Christiaan P. M.; Hester, Martinus J.; Prinsen, Wilhelmus J. C.; and van de Weyer, Fransiscus J. M., to Stork X-Cel B.V. Inkjet nozzle for an inkjet printer. 5,491,499, Cl. 347-47.000.
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Black, Alan J., to Sound Leisure Limited. Amusement apparatus. 5,490,677, Cl. 273-351.000.
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Blake, David F.; Bryson, Charles; and Freund, Friedemann, to United States of America, National Aeronautics and Space Administration. X-ray diffraction apparatus. 5,491,738, Cl. 378-71.000.
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Blough, Herbert A., to U.S. Bioscience, Inc. Compositions of N-(phosphonoacetyl)-L-aspartic acid and methods of their use as broad spectrum antivirals. 5,491,135, Cl. 514-115.000.
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Bonafini, James A., Jr. Copolymers for optical fibers. 5,491,770, Cl. 385-145.000.
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Mudge, Elbert H.; and Brabson, Thomas D., 5,491,004, Cl. 427-393.400.
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Lawson, David F.; Antkowiak, Thomas A.; Hall, James E.; and Stayer, Mark L., Jr., 5,491,230, Cl. 540-450.000.
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Gerigk, Markus; Brück, Jochen; and Hovestadt, Wieland, 5,490,939, Cl. 210-652.000.

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Hutsell, Larry; Bruner, Curt; Reh, Jeff; and Albert, Glenn, 5,491,395, Cl. 318-560.000.

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Behrens, Steven D.; and Bullin, Jerry A., 5,490,873, Cl. 95-160.000.

Bryant, Edward W. S.; and Mackenzie, Burton T., to Camco International Inc. Maximum temperature indicator. 5,490,475, Cl. 116-217.000.

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Stuart, Warner H., 5,490,458, Cl. 101-375.000.

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Blake, David F.; Bryson, Charles; and Freund, Friedemann, 5,491,738, Cl. 378-71.000.

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Enlow, Howard H.; Huffer, Scott W.; Young, Frederick; and Buehne, William J., 5,490,893, Cl. 156-230.000.

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Holtey, Thomas O., 5,491,827, Cl. 395-800.000.
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Burdess, James S., to British Technology Group Ltd. Gyroscopic devices. 5,490,420, Cl. 73-504.020.

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Hahn, Rainer; and Burger, Bernd, 5,490,810, Cl. 451-165.000.

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Leiber, Heinz; Burghoff, Heinz-Georg; and Brinkmeyer, Horst, 5,491,383, Cl. 315-77.000.

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Peet, Norton P.; Johnston, J. O'Neal; and Burkhart, Joseph P., 5,491,136, Cl. 514-172.000.

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Burkinshaw, Brian D.; and Wheeler, John L., to Intermedics Orthopedics, Inc. Orthopedic bone plug cutter. 5,490,853, Cl. 606-79.000.

Burnett, John L.: *See—*
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Burns, William S.; and Sweeney, Patrick J. Adjustable wall tie. 5,490,366, Cl. 52-713.000.

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Bussiere, Robert A. Glow-in-the-dark material for fishing accessories. 5,490,344, Cl. 43-17.500.

Bustos, Rafael T., to L&P Property Management Company. Cooler display rack with adjustable gravity feed shelves. 5,490,600, Cl. 211-187.000.

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Tracy, Lawrence R.; Eggers, Frederick W.; Houston, David; Wallace, Walter B.; and Bamford, Jeffrey, 5,491,467, Cl. 340-522.000.

Cabletron Systems, Inc.: *See—*
Oliver, Chris; and Hullette, Dan, 5,491,694, Cl. 370-85.400.

Cahoon, John M.: *See—*
Smith, Thomas R.; Salomon, Mary F.; Davis, Kirk E.; Karn, Jack L.; and Cahoon, John M., 5,490,945, Cl. 252-18.000.

Cajon Company: *See—*
Fisher, Ronald K.; Babuder, Gerald A.; and Doty, David L., 5,490,693, Cl. 285-92.000.

Calande, Richard. Plant puller. 5,490,374, Cl. 56-400.210.

Calhoun, John L., to Sanden International (U.S.A.), Inc. Variable capacity scroll type fluid displacement apparatus. 5,490,769, Cl. 418-1.000.

California Energy Commission: *See—*
Janes, Clarence W., 5,490,377, Cl. 60-39.120.

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Barhen, Jacob; Toomarian, Nikzad; Fijany, Amir; and Zak, Michail, 5,491,650, Cl. 364-606.000.

Callahan, Shawn F.: *See—*
Lamberty, Bruce R.; Callahan, Shawn F.; and Johnson, Daniel N., 5,490,463, Cl. 102-439.000.

Calnan, Thomas. Surveillance camper top. 5,490,704, Cl. 296-24.100.

Calvignac, Jean: *See—*
Basso, Claude; Calvignac, Jean; Pham, Tan T.; and Rheinart, Charles, 5,491,815, Cl. 395-550.000.

Camco International Inc.: *See—*
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Campbell, William T.: *See—*
Krum, Alvin L.; and Campbell, William T., 5,490,627, Cl. 228-124.100.

Campillo, Anthony J.: *See—*
Justus, Brian L.; Huston, Alan L.; and Campillo, Anthony J., 5,491,579, Cl. 359-241.000.

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Campos, Margot; Pfuetzenreuter, Dirk; Franke, Guenter; and Greene, Michael J , to Bayer Corporation. Process for the preparation of organic pigments. 5,491,235, Cl. 546-57.000.

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Asano, Shinya, 5,490,733, Cl. 400-223.000.
Katsuie, Ichiro, 5,491,421, Cl. 324-452.000.
Kawakami, Soichiro, 5,491,037, Cl. 429-49.000.

Kawakami, Tatsuro; Yoshimura, Yuichiro; and Kobayashi, Katsuyuki, 5,491,305, Cl. 178-19.000.
Matsuhisa, Hirohide; Midorikawa, Satoko; and Mima, Sumire, 5,490,894, Cl. 134-30.000.
Nagashima, Toshiaki; Kitayama, Kunihiko; and Oyama, Kiyoshi, 5,491,542, Cl. 355-260.000.
Shiozawa, Takahisa, 5,491,534, Cl. 355-69.000.
Shoji, Takeo; and Shimizu, Yasushi, 5,491,539, Cl. 355-200.000.
Suzuki, Toshio; Saito, Asao; Shibata, Makoto; Kobayashi, Junichi; Komuro, Hirokazu; Mori, Toshihiro; Koyama, Shuji; Yokoyama, Sakai; Koizumi, Ryoichi; and Murakami, Keiichi, 5,491,505, Cl. 347-203.000.
Yagi, Takayuki; Komatsu, Toshiyuki; Sato, Yasue; and Kawate, Shinichi, 5,490,896, Cl. 156-345.000.
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O'Brien, Michael J.; Carabbio, Robert M.; Hemsath, Bill; Knussmann, Kevin D.; and Robbins, Thomas C., 5,491,647, Cl. 364-551.020.

Carbaugh, Jr., John E.: *See—*
Chiknas, Steven G., 5,490,981, Cl. 424-194.100.

Carbon, Ludwig: *See—*
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Carbonneau, Guy A.: *See—*
Pisello, Thomas; and Carbonneau, Guy A., 5,491,812, Cl. 395-500.000.

Cardis, Angeline B.: *See—*
Baillargeon, David J.; Cardis, Angeline B.; and Heck, Dale B., 5,490,863, Cl. 44-331.000.

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Hellmuth, Thomas; and Wei, Jay, 5,491,524, Cl. 351-212.000.

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Georgi, Bernd; Czepan, Bernd; and Peter, Heinz, 5,491,638, Cl. 364-474.370.

Carlin, Timothy J.: *See—*
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Carlo, L. David: *See—*
Winner, James E., Jr.; and Carlo, L. David, 5,490,304, Cl. 16-82.000.

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Carmein, David E. E. Virtual reality system with enhanced sensory apparatus. 5,490,784, Cl. 434-55.000.

Carosa, Paul F., to Delco Electronics Corp. Power converter with emergency operating mode for three phase induction motors. 5,491,622, Cl. 363-56.000.

Carrall, Christopher R.: *See—*
Hanns, David T.; and Carrall, Christopher R., 5,490,571, Cl. 175-323.000.

Carrall, Christopher Richard: *See—*
Hanns, David T.; and Carrall, Christopher R., 5,490,571, Cl. 175-323.000.

Carrier Corporation: *See—*
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Carrigan, Lori L.: *See—*
Luedtke, Roy, Jr.; and Carrigan, Lori L., 5,491,286, Cl. 800-200.000.

Carrington, James C.; and Dolja, Valerian V., to Texas A&M University System, The. Expression of foreign genes using a replicating polyprotein producing virus vector. 5,491,076, Cl. 435-70.100.

Carter, Conrad C.; and Carter, Sharon G. Remotely controlled radar gun and video recording apparatus. 5,491,464, Cl. 340-425.500.

Carter, Gary D.: *See—*
Best, John W.; Flippo, Bob K.; Walker, James D.; and Carter, Gary D., 5,490,592, Cl. 198-812.000.

Carter, Mark C. Collapsible shelter with elevated canopy. 5,490,533, Cl. 135-145.000.

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Hagan, Desmond B.; and Carter, Peter, 5,490,955, Cl. 252-554.000.

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Casavant, Scott D.; and Savatier, Tristan, to RCA Thomson Licensing Corporation. Field elimination apparatus for a video compression/decompression system. 5,491,516, Cl. 348-415.000.

Casio Computer Co., Ltd.: *See—*
Mase, Tomokazu; Murata, Yoshiyuki; Ariizumi, Masahito; and Sato, Shinichiro, 5,491,777, Cl. 395-133.000.

Cass, Todd A.: *See—*
Withgott, M. Margaret; Bagley, Steven C.; Bloomberg, Dan S.; Halvorsen, Per-Kristian; Huttenlocher, Daniel P.; Cass, Todd A.; Kaplan, Ronald M.; and Rao, Ramana R., 5,491,760, Cl. 382-203.000.

Casson, Robert D.; and Lovelady, John A., to Genzyme Limited. Controlled molecular weight reduction of polymers. 5,491,227, Cl. 536-124.000.

Castagnani, Roberto: *See—*
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Castagnos, Stéphane; and Limousin, Jean-Louis, to Societe Europeenne De Propulsion. Method of fabricating a composite material part, in particular a sandwich panel, from a plurality of assembled-together preforms. 5,490,892, Cl. 156-89.000.

Catchpole, Clive E.: *See—*
Concannon, David J.; Copenhaver, Gary B.; Bakker, Johan P.; Catchpole, Clive E.; and Vala, John D., 5,491,336, Cl. 250-228.000.

Caterpillar Inc.: *See—*
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Engel, William K., 5,490,446, Cl. 92-157.000.
Feucht, Joel D.; Shoup, Stephen G.; and Swanson, Victor E., 5,490,762, Cl. 415-168.100.
Gill, Avtar S., 5,491,619, Cl. 362-294.000.
Lunzman, Stephen V., 5,490,384, Cl. 60-327.000.

Caubere, Catherine: *See—*
Caubere, Paul; Jamart-Gregoire, Brigitte; Caubere, Catherine; Bizot-Espiard, Jean-Guy; Renard, Pierre; and Adam, Gérard, 5,491,163, Cl. 514-411.000.

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Ciabatti, Romeo; and Cavalleri, Bruno, 5,491,128, Cl. 514-11.000.

Cecchi, Marino; and Suffi, Guerrino, to Wico Corporation. Joystick controller. 5,491,462, Cl. 338-128.000.

Celii, Francis G.: *See—*
Kao, Yung-Chung; and Celii, Francis G., 5,490,880, Cl. 118-665.000.

Celltech, Limited: *See—*
Boyd, Ewan C.; Eaton, Michael A. W.; and Warrellow, Graham J., 5,491,147, Cl. 514-247.000.

Centofante, Charlie: *See—*
Farquhar, Jim; Dorf, Ken; Weibezahn, Brandt; Fajardo, Iggoni; and Centofante, Charlie, 5,490,891, Cl. 156-73.100.

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Desu, Seshu B.; Yoo, In K.; Kwok, Chi K.; and Vijay, Dilip P., 5,491,102, Cl. 437-52.000.

Cetus Oncology Corporation: *See—*
Halenbeck, Robert F.; Koths, Kirston E.; and Wrin, Joseph W., 5,491,065, Cl. 435-7.100.

Chace, Raymond A., Jr.; and Manning, Mark C., to Sippican, Inc. Expendable underwater vehicle. 5,490,473, Cl. 114-330.000.

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Craig, W. Scott: *See—*
Blanchard, Clarence E.; Rogers, Duane E.; Hall, Charles B.; Mooney, Robert; Craig, W. Scott; and Bergman, Dean P., 5,490,804, Cl. 440-38.000.

Cranford, Elwyn L., III: *See—*
Corpora, Gary J.; Bengel, Thomas G.; and Cranford, Elwyn L., III, 5,491,731, Cl. 376-307.000.

Cranney, Don H.; Lawrence, Lawrence D.; and Jackson, Michael M., to Dyno Nobel Inc. Low density watergel explosive composition. 5,490,887, Cl. 149-2.000.

Cray Computer Corporation: *See—*
Huppenthal, Jon M.; Saunders, Candy L.; and Jaramillo, Joseph E., 5,491,300, Cl. 174-151.000.

Cronk, Tommy J. Modular protective pipeline cover. 5,490,742, Cl. 405-157.000.

Crouse, Helen C.: *See—*
Naylor, Thomas K.; Crouse, Helen C.; and Muz, Edwin, 5,491,299, Cl. 174-36.000.

Crowley, Thomas J. Avalanche victim's air-from-snow breathing device. 5,490,501, Cl. 128-204.170.

Culbert, James A.: *See—*
Belove, Edward; Culbert, James A.; Johnson, R. Patrick; Heath, David M.; Kraley, Michael F.; Méndez, Deborah; Pant, Sangam; and Zagieboylo, Stephen, 5,491,820, Cl. 395-600.000.

Cullen, Christopher P. Mechanical stabilizer. 5,490,648, Cl. 248-188.300.

Curran, John W.: *See—*
Anderson, Philip M.; and Curran, John W., 5,490,450, Cl. 73-862.324.

Currie, Joseph E. Illuminated fluid tap. 5,491,617, Cl. 362-96.000.

Custro, Sergio; and Viola, Gian L., to Enichem Elastomeri S.R.L. Hydrogenated block copolymers containing epoxy groups and their preparation. 5,491,197, Cl. 525-332.800.

Cutts, William T. Floating roof storage tank. 5,490,605, Cl. 220-211.000.

Cybor Corporation: *See—*
Bailey, David C.; and Martin, Carl A., 5,490,765, Cl. 417-2.000.

Cypress Semiconductor Corporation: *See—*
Phelan, Cathal G., 5,491,664, Cl. 365-200.000.

Cypros Pharmaceutical Corporation: *See—*
Abushanab, Elie, 5,491,146, Cl. 514-261.000.

Czepan, Bernd: *See—*
Georgi, Bernd; Czepan, Bernd; and Peter, Heinz, 5,491,638, Cl. 364-474.370.

Dabbs, Timothy P., to Commonwealth Scientific and Industrial Research Organization. Interference methods and interference microscopes for measuring energy path length differences, path length between two locaitons or for determiing refractive index. 5,491,550, Cl. 356-345.000.

Daberko, Norbert P.: *See—*
Norris, Elwood G.; Daberko, Norbert P.; and Brightbill, Steven T., 5,491,774, Cl. 395-2.790.

Daewoo Electronics Co., Ltd.: *See—*
Kim, Jong-Hoon, 5,491,519, Cl. 348-620.000.
Kim, Young-Sang, 5,491,518, Cl. 348-607.000.

Dagle, John M.: *See—*
Walder, Joseph A.; Walder, Roxanne Y.; Eder, Paul S.; and Dagle, John M., 5,491,133, Cl. 514-44.000.

Daicel Chemical Industries, Ltd.: *See—*
Okamoto, Yoshio, 5,491,223, Cl. 536-18.700.

Daigle, Lyman R.; Ledesma, Andrew C.; and Ang, Sotero A., to Timex Corporation. Electroluminescent edge connect-composite lamp/strip and method of making the same. 5,491,379, Cl. 313-509.000.

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Tanikake, Makoto; Morinaga, Yoshiki; Shirai, Katsuhiko; and Shimada, Masanori, 5,490,483, Cl. 123-65.00P.

Daikin Industries, Ltd.: *See—*
Sada, Shinri, 5,490,399, Cl. 62-510.000.
Yoshino, Norio, 5,491,257, Cl. 562-41.000.

Daisy Kingdom: *See—*
Reed, Patricia M., 5,491,616, Cl. 362-35.000.

Dakota Mfg. Co.,Inc.: *See—*
Voelzke, Harry E., 5,490,754, Cl. 414-537.000.

Dalpe, Dennis J.: *See—*
Bewlay, Bernard P.; and Dalpe, Dennis J., 5,490,969, Cl. 419-68.000.

Damadian, Raymond V.; and Votruba, Jan, to Fonar Corporation. Multiple patient breast scanning on a magnetic resonance imaging apparatus. 5,490,513, Cl. 128-653.200.

Dana Corporation: *See—*
Plunkett, Thomas P.; and Kestly, Michael J., 5,490,681, Cl. 277-235.00B.

Dane, Gary T., to Poly-Vac Incorporated. Sterilization and storage container tray. 5,490,975, Cl. 422-300.000.

Dangi, Ryoichi, to Kawasaki Steel Corporation. Signal processing apparatus and learning method therefor. 5,491,776, Cl. 395-11.000.

Danielsen, Frede; and Jespersen, Carsten, to KE-Burgmann A/S. Air injection tube and a method for air injection. 5,490,813, Cl. 454-306.000.

Dankman, Scott; and Lastinger, Roc A., to TelePad. Portable electronic platform system. 5,491,609, Cl. 361-686.000.

Dardel, Eric. Device for locating and puncturing blood vessels. 5,490,522, Cl. 128-662.050.

Darnell, Eric. Ambidextrous boomerang. 5,490,678, Cl. 273-426.000.

Data General Corporation: *See—*
Driscoll, Edward K.; Nigro, Arthur R.; and Fillio, Thomas D., 5,490,723, Cl. 312-334.280.

Datascope Investment Corp.: *See—*
Schock, Robert B.; and Hunsicker-Sanko, Victoria, 5,490,820, Cl. 601-41.000.

Daughenbaugh, Norman E.; and Goodfellow, Dane G., to Hercules Incorporated. Process for hydrotreating resins to lighten color. 5,491,214, Cl. 528-483.000.

Daugs, Edward D.: *See—*
Flynn, Gary A.; Bey, Philippe; Warshawsky, Alan M.; Beight, Douglas W.; Mehdi, Shujaath; Giroux, Eugene L.; Burkholder, Timothy P.; Daugs, Edward D.; and French, John F., 5,491,143, Cl. 514-214.000.

Davenport, Donald K.; and Schreiner, Joel M., to Deere & Company. Device and method for truing doffers. 5,490,373, Cl. 56-41.000.

David Sarnoff Research Center, Inc.: *See—*
Dingwall, Andrew G. F.; and Scheps, Jonathan L., 5,491,482, Cl. 342-42.000.

Davidson, Dennis A. Paint pail carrier. 5,490,618, Cl. 224-148.000.

Davies, Donald M.: *See—*
Setcavage, Thomas M.; Reis, Kathleen J.; Davies, Donald M.; and Mazur, Edward J., 5,491,067, Cl. 435-7.250.

Davis, Charles J.: *See—*
Maiocco, Richard P., Sr., 5,491,466, Cl. 340-467.000.

Davis, Dennis; Beam, Harold D.; and Kruke, Jeffrey J., to Nordson Corporation. Apparatus for proportioning two components to form a mixture. 5,490,726, Cl. 366-152.100.

Davis, Gordon T.; Linger, Judith M.; Mandalia, Baiju D.; Sinibaldi, John C.; Zevin, William M.; and Ziegenhain, Karl-Heinz, to International Business Machines Corporation. Method and system for automatically determining data communication device type and corresponding transmission rate. 5,491,720, Cl. 375-222.000.

Davis, John R.: *See—*
Meister, John A.; and Davis, John R., 5,490,449, Cl. 99-330.000.

Davis, Kirk E.: *See—*
Smith, Thomas R.; Salomon, Mary F.; Davis, Kirk E.; Karn, Jack L.; and Cahoon, John M., 5,490,945, Cl. 252-18.000.

Davis, Leighton I.: *See—*
Madau, Dinu P.; Feldkamp, Lee A.; Seippel, Steven H.; Yuan, Fumin; and Davis, Leighton I., 5,491,775, Cl. 315-3.000.

Davis, Paul J.: *See—*
Beggs, Thomas S.; Davis, Paul J.; and Verboeyen, Martine E., 5,490,988, Cl. 424-464.000.

Davis, Richard E.; and McLellan, Garey L., to Medtronic, Inc. Ultrasound biopsy needle. 5,490,521, Cl. 128-662.020.

Davis, Thomas R., to Snyder Industries, Inc. Fluid tank apparatus. 5,490,603, Cl. 220-4.120.

Day, Edward W.: *See—*
Warmerdam, Theo W.; Nolten, Henk G.; Day, Edward W.; Hetzer, Joseph S.; and Goel, Anil B., 5,490,876, Cl. 106-213.000.

Day, Scott A. Fitted hair towel. 5,490,528, Cl. 132-200.000.

Deacon, David A. G.; Bischel, William K.; Brinkman, Michael J.; and Field, Simon J., to Deacon Research. ATM switch with electrically-controlled waveguide-routing. 5,491,762, Cl. 385-16.000.

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Deacon, David A. G.; Bischel, William K.; Brinkman, Michael J.; and Field, Simon J., 5,491,762, Cl. 385-16.000.

De Angelis, Francesco: *See—*

Giannessi, Fabio; Castagnani, Roberto; Tinti, Maria O.; De Angelis, Francesco; De Witt, Paolo; and Misiti, Domenico, 5,491,260, Cl. 562-567.000.

Dearing, Mary K.; and Robb, Rose A. Swing arm chair. 5,490,710, Cl. 297-162.000.

DeArmas, Jose I.: *See*—
Alsberg, Roger C.; DeArmas, Jose I.; Hanson, Scott L.; Higgins, William B.; Miyasato, Philip G.; and Nayak, Ashok B., 5,491,595, Cl. 360-75.000.

DeBoer, Charles D.; Henzel, Richard P.; Neumann, Stephen M.; and Tutt, Lee W., to Eastman Kodak Company. Image dye combination for laser ablative recording element. 5,491,045, Cl. 430-200.000.

DeBoer, Charles D.; and Haley, Neil F., to Eastman Kodak Company. Method of imaging a lithographic printing plate. 5,491,046, Cl. 430-302.000.

de Boer, Gerben F.: *See*—
Noteborn, Matheus H. M.; and de Boer, Gerben F., 5,491,073, Cl. 435-69.100.

DeBoy, Dean C.: *See*—
Grunewald, Fred A.; DeBoy, Dean C.; and Whitmyer, Wayne E., 5,490,358, Cl. 52-235.000.

DeCory, John F.; James, Robert O.; Tingler, Kenneth L.; and Wexler, Ronald M., to Eastman Kodak Company. Photographic element. 5,491,051, Cl. 430-496.000.

Deere & Company: *See*—
Davenport, Donald K.; and Schreiner, Joel M., 5,490,373, Cl. 56-41.000.
Schlueter, Francis E., 5,490,372, Cl. 56-33.000.
Whitenight, Donald R., 5,490,814, Cl. 474-92.000.

Deguchi, Masaharu: *See*—
Yamasaki, Futoshi; Ariki, Yoshio; Deguchi, Masaharu; Kakuda, Takashi; Hisada, Takanori; and Maruyama, Takesuke, 5,491,525, Cl. 353-98.000.

Dehara, Masayoshi: *See*—
Uehara, Takafumi; and Dehara, Masayoshi, 5,491,440, Cl. 327-172.000.

DeHetre, Gregory G.: *See*—
Thompson, Phillip F.; Finck, Howard D.; Sheppard, Donald K.; and DeHetre, Gregory G., 5,491,797, Cl. 395-200.030.

Dehne, Heinz-Wilhelm; Brandes, Wilhelm; Kuck, Karl-Heinz; and Seitz, Thomas, to Bayer Aktiengesellschaft. Fungicidal active compound combinations. 5,491,165, Cl. 514-479.000.

Deisenroth, Ted: *See*—
Haniff, Marlon; Falk, Robert; Deisenroth, Ted; and Mueller, Karl F., 5,491,261, Cl. 562-582.000.

De La Cruz, Jose R. Exterior automobile sunshield. 5,490,707, Cl. 296-95.100.

de la Luz, Juan B.; Dzung, John C.; Hernandez, Orlando; and Beasley, Jeff R., to Motorola, Inc. Seal membrane with integral microphone support. 5,491,478, Cl. 341-22.000.

Delco Electronics Corporation: *See*—
Brandenburg, Scott D.; Murphy, William S.; Syed, Ahmer R.; King, David A.; and Yeh, Shing, 5,491,364, Cl. 257-786.000.
Carosa, Paul F., 5,491,622, Cl. 363-56.000.
Moller, David D.; and Archibald, James B., 5,491,445, Cl. 327-540.000.
Pawlak, Andrzej M.; Lin, William C.; Graber, David W.; Eckhardt, Dennis C.; Weiss, Scott E.; Radamis, Maged; Perry, Thomas A.; and Bradley, John R., 5,491,632, Cl. 364-424.050.
Zarabadi, Seyed R., 5,491,443, Cl. 327-391.000.

de Lestang, Michel: *See*—
Bouraly, Jean-Pierre; Aebi, Jurg; Beaufils, Philippe; de Lestang, Michel; Gaffuri, Jean-Gilles; Hourlier, Hervé; Lallement, Jean-Jacques; Legroux, Philippe; Levai, Jean-Paul; Pondaven, Gérald; Schuster, Pierre; and Vergnat, Christian, 5,490,855, Cl. 606-88.000.

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Bowman, Michael E.; Correll, Robert S., Jr.; Dellinger, Donald E.; Kemmick, Dennis L.; and Kocher, Timothy L., 5,490,787, Cl. 439-79.000.

Deltec Fuel Systems B.V.: *See*—
Klimstra, Jacob; and De Voogd, Abraham, 5,491,416, Cl. 324-393.000.

Demuth, Thomas P., Jr.; and White, Ronald E., to Procter & Gamble Company, The. Antimicrobial quinolonyl lactams. 5,491,139, Cl. 514-192.000.

Dennison, Charles; and Fazan, Pierre, to Micron Technology, Inc. Capacitor structures for dynamic random access memory cells. 5,491,356, Cl. 257-306.000.

Denny Bros. Printing Limited: *See*—
Howard, Robin G., 5,490,692, Cl. 283-81.000.

DePace, Ronald A.: *See*—
Kei Lau, James C.; Malmgren, Richard P.; and DePace, Ronald A., 5,491,304, Cl. 174-264.000.

DePalma, Christopher L.; McHugh, William T.; Sargeant, Sean A.; Wiacek, Marian; and Yoppolo, Robert A., to Duracell Inc. Contact ring for on-cell battery tester. 5,491,038, Cl. 429-91.000.

Derby, Norwin C., to Super Sack Manufacturing Corp. Bulk container and process for manufacture of same. 5,490,828, Cl. 493-220.000.

Deriaud, Thierry: *See*—
D'Obrenan, Jean V.; Madigou, Nicole; and Deriaud, Thierry, 5,490,869, Cl. 75-10.140.

Derosa, Thomas F.; Sung, Rodney L.; and Kaufman, Benjamin J., to Texaco Inc. Composition of matter for aliphatic-aromatic ureas, biurets, and allophanates as nitric oxide reducing agents in diesel emissions. 5,491,256, Cl. 560-132.000.

Desai, Ashvin H. Endoscopic surgical instrument. 5,490,836, Cl. 604-21.000.

Desai, Vinod; and Tesch, Richard E., to Dreco, Inc. Telescopic flare pipe tower. 5,490,364, Cl. 52-637.000.

de Santis, Alberto, to Industrie Natuzzi S.p.A. Metal crib structure for a rocking chair seating plane. 5,490,714, Cl. 297-267.100.

Desclos, Pierre: *See*—
Bonniot, Claude; Vuillamy, Didier; Desclos, Pierre; Tiret, Etienne; and Beaurain, André, 5,490,629, Cl. 239-265.150.

Desilva, Renuka: *See*—
Akhavan-Tafti, Hashem; Desilva, Renuka; and Sugioka, Katsuaki, 5,491,072, Cl. 435-28.000.

Desmarais, Brett A.: *See*—
Friday, Arthur F., Jr.; Chan, Chi-Ping; and Desmarais, Brett A., 5,491,649, Cl. 364-579.000.

Desnick, Robert J.; Bishop, David F.; Ioannou, Yiannis A.; and Wang, Anne M., to City University of New York, The Mount Sinai School of Medicine of the. Cloning and expression of biologically active α-N-acetylgalactosaminidase. 5,491,075, Cl. 435-69.700.

deSolms, S. Jane; and Graham, Samuel J., to Merck & Co., Inc. Inhibitors of farnesyl-protein transferase. 5,491,164, Cl. 514-423.000.

De Somer, Michel P. M.: *See*—
Verhille, Henri A. J.; Henrion, Michel A. R.; De Somer, Michel P. M.; and Pauwels, Bart J. G., 5,491,728, Cl. 375-362.000.

Despland, Claude; Gnagi, Christophe; and Podavini, Giacomo, to Kraft Jacobs Suchard AG. Process for producing an improved sucrose-free milk chocolate. 5,490,996, Cl. 426-548.000.

Desu, Seshu B.; Yoo, In K.; Kwok, Chi K.; and Vijay, Dilip P., to Ceram Incorporated; Sharp Kabushiki Kaisha; and Virginia Polytechnic Institute and State University. Method of forming multilayered electrodes for ferroelectric devices consisting of conductive layers and interlayers formed by chemical reaction. 5,491,102, Cl. 437-52.000.

Developpement D'Implants Orthopediques et Medicaux: *See*—
Bouraly, Jean-Pierre; Aebi, Jurg; Beaufils, Philippe; de Lestang, Michel; Gaffuri, Jean-Gilles; Hourlier, Hervé; Lallement, Jean-Jacques; Legroux, Philippe; Levai, Jean-Paul; Pondaven, Gérald; Schuster, Pierre; and Vergnat, Christian, 5,490,855, Cl. 606-88.000.

Devilliers, Henry: *See*—
Jones, Mark F.; and Devilliers, Henry, 5,491,547, Cl. 356-28.000.

Devine, Denise L.; Katz, Sheila M.; Salmon, Peter M.; and Sweet, M. Lynne, to Devine Foods, Inc. Edible fiber-containing product and composition. 5,490,997, Cl. 426-573.000.

Devine Foods, Inc.: *See*—
Devine, Denise L.; Katz, Sheila M.; Salmon, Peter M.; and Sweet, M. Lynne, 5,490,997, Cl. 426-573.000.

De Voogd, Abraham: *See*—
Klimstra, Jacob; and De Voogd, Abraham, 5,491,416, Cl. 324-393.000.

Devore, David D.: *See*—
Rosen, Robert K.; and Devore, David D., 5,491,246, Cl. 556-7.000.

DeVries, Robert A.: *See*—
Stark, Edmund J.; Schultz, John A.; Ecker, Ernest L.; and DeVries, Robert A., 5,491,250, Cl. 556-466.000.

DeWitt, Charles G.: *See*—
Mudge, Elbert H.; and DeWitt, Charles G., 5,491,026, Cl. 428-395.000.

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De Witte, Mireille B. A., to Imperial Chemical Industries PLC. Process for preparing a flexible polyurethane foam. 5,491,177, Cl. 521-159.000.

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Seibel, Lawrence P., 5,491,031, Cl. 428-458.000.

Dezso, Paul M. Door locking system. 5,490,698, Cl. 292-138.000.

Dhawan, Sudhir: *See*—
Arimilli, Ravi K.; Dhawan, Sudhir; and Siegel, David W., 5,491,811, Cl. 395-471.000.

D'Hont, Loek J., to Texas Instruments Incorporated. Single loop transponder system and method. 5,491,483, Cl. 342-42.000.

Diab, Mohamed K.; Kiani-Azarbayjany, Esmaiel; and Weber, Walter M., to Masimo Corporation. Signal processing apparatus. 5,490,505, Cl. 128-633.000.

DiBella, James A. Magnetically triggered elapsed time indicator. 5,491,476, Cl. 340-933.000.

Diepstraten, Wilhelmus J. M., to NCR Corporation. Wireless communication system having antenna diversity. 5,491,723, Cl. 375-267.000.

Dietl, Steven J.; and Breemes, David P., to Xerox Corporation. Medium for ink delivery systems. 5,491,501, Cl. 347-86.000.

Diffrient, Niels, to Howe Furniture Corporation. Adjustable keyboard support. 5,490,466, Cl. 108-96.000.

Diffrient, Niels, to Howe Furniture Corporation. Folding table mechanism. 5,490,467, Cl. 108-133.000.

Diggs, Matthew B., to Ford Motor Company. Eight cylinder internal combustion engine with variable displacement. 5,490,486, Cl. 123-198.00E.

Digital Access Corporation: *See*—
Meagher, John L.; Rothrauff, Charles E.; and Alexander, Trey, 5,491,695, Cl. 370-112.000.

Digital D.I. Inc.: *See*—
Takahisa, Tsutomu; Iida, Motohisa; and Allen, Lucille, 5,491,838, Cl. 455-66.000.

Digital Equipment Corporation: *See*—
Jain, Rajendra K.; Ramakrishnan, K. K.; and Chiu, Dah-Ming, 5,491,801, Cl. 395-200.130.

Digital Equipment Corporation, Patent Law Group: *See*—
Kaufman, Charles W.; Pearlman, Radia J.; and Gasser, Morrie, 5,491,752, Cl. 380-30.000.

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Gunner, Christopher W.; Harper, John A.; and Shand, Ian M. C., 5,491,692, Cl. 370-85.130.

Digital Pictures, Inc.: *See*—
Klein, Mark D.; and Keen, Dana, 5,491,685, Cl. 370-7.000.

Digital Voice Systems, Inc.: *See*—
Hardwick, John C.; and Lim, Jae S., 5,491,772, Cl. 395-2.350.

Dimakis, Alkiviadis G.: *See*—
Park, David W.; Hunter, Frank R.; and Dimakis, Alkiviadis G., 5,491,033, Cl. 428-537.100.

Ding, Cheng-Liang: *See*—
Scepanovic, Ranko; and Ding, Cheng-Liang, 5,491,641, Cl. 364-491.000.

Ding, Hong: *See*—
Harris, Frank W.; and Ding, Hong, 5,491,200, Cl. 525-419.000.

Ding, Jian: *See*—
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Dingman, Sean D.: *See*—
Backes, Thomas W.; Dingman, Sean D.; and Verrett, Sheldon P., 5,490,949, Cl. 252-174.000.

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Dinsmoor, John C., III; and VanEveren, Barry, to Jay Medical Ltd. Seating system with pressure relieving fluid pad. 5,490,299, Cl. 5-654.000.

Dinulescu, Horia A. Heat exchanger with finned partition walls. 5,490,559, Cl. 165-148.000.

Dion, William D. Detachably mounted back washer with inflatable bladder. 5,490,302, Cl. 15-210.100.

Director-General of Agency of Industrial Science and Technology: *See*—
Suzuki, Takahiro; Kawamura, Sukezo; Toriyama, Motohiro; Yokokawa, Yoshiyuki; Kawamoto, Yukari; Hakamatsuka, Yasuharu; and Irie, Hiroyuki, 5,491,082, Cl. 435-176.000.

Direnzo, Christine J. Lace works for bathroom sinks and similar articles. 5,490,291, Cl. 4-661.000.

Dirmi, Goberdhan P.; Campisi, Judith; and Peacocke, Monica, to University of California, The Regents of the. Biomarkers of cell senescence. 5,491,069, Cl. 435-18.000.

Distefano, Thomas H.; Kovac, Zlata; and Grange, John, to Tessera, Inc. Microelectronic bonding with lead motion. 5,491,302, Cl. 114-260.000.

Dix, Johannes P.; Baus, Ulf; Beck, Karin H.; and Raulfs, Friedrich-Wilhelm, to BASF Aktiengesellschaft. Electrostatic toners with polyamine charge stabilizers. 5,491,043, Cl. 430-110.000.

Dixit, Girish A.: *See*—
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Dixon, Dan H.: *See*—
Corpora, Gary J.; Miller, Phillip E.; Bengel, Thomas G.; Bauer, Frank I.; Dixon, Dan H.; and Sejvar, James, 5,491,732, Cl. 376-313.000.

Dixon, Michael; Hudson, James B.; and Apogee, Jon, to Sport Carriers, Incorporated. Ski-carrier module with module attachment apparatus. 5,490,621, Cl. 224-319.000.

D'Obrenan, Jean V.; Madigou, Nicole; and Deriaud, Thierry, to Promethee; Soretel; and Constructions Electriques Celes. Process and device for treating pollutant, fusible materials. 5,490,869, Cl. 75-10.140.

Doeringer, Willibald: *See*—
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Doggett, David E.: *See*—
McCaul, Bruce W.; Doggett, David E.; and Thorson, Eric K., 5,491,341, Cl. 250-343.000.

Dohmeier, Steven C.; and Gage, Edward C., to Eastman Kodak Company. Apparatus and method for controllable gain and phase matching in an optical data storage system with source noise subtraction. 5,491,682, Cl. 369-124.000.

Doi, Kunio: *See*—
Zhang, Wei; and Doi, Kunio, 5,491,627, Cl. 364-413.200.

Doi, Yoshihisa: *See*—
Ando, Shoichi; Doi, Yoshihisa; and Otsubo, Makoto, 5,490,408, Cl. 72-256.000.

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Dolja, Valerian V.: *See*—
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Dolomite S.p.A.: *See*—
Zerbinati, Gianfranco, 5,490,337, Cl. 36-119.000.

Domenig, Georg, to Grass America, Inc. Drawer guide for supporting a moveable structure such as a drawer in a furniture article. 5,490,724, Cl. 312-334.450.

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Dondi, Gilberto: *See*—
Ciceri, Silvana; Dondi, Gilberto; and Scurati, Paolo, 5,491,154, Cl. 514-356.000.

Donlar Corporation: *See*—
Batzel, Daniel A., 5,491,213, Cl. 528-480.000.

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Dorf, Ken: *See*—
Farquhar, Jim; Dorf, Ken; Weibezahn, Brandt; Fajardo, Iggoni; and Centofante, Charlie, 5,490,891, Cl. 156-73.100.

Dorsey, Paul S., to Whirlpool Corporation. Flat high temperature membrane switch display window. 5,491,314, Cl. 200-313.000.

Doty, David L.: *See*—
Fisher, Ronald K.; Babuder, Gerald A.; and Doty, David L., 5,490,693, Cl. 285-92.000.

Douglas, Thomas B.; and Torres, Robert J., to International Business Machines Corporation. Method and apparatus for facilitating integrated icon-based operations in a data processing system. 5,491,783, Cl. 395-159.000.

Douglas, Thomas B.; and Torres, Robert J., to International Business Machines Corporation. Method and apparatus for facilitating integration of software objects between workspaces in a data processing system graphical user interface. 5,491,784, Cl. 395-159.000.

Dow Chemical Company, The: *See*—
Grier, Laura A.; Neill, Paul L.; Priester, Ralph D.; Mobley, Larry W.; Skaggs, Kenneth W.; and Turner, Robert B., 5,491,174, Cl. 521-126.000.
Grierson, Jeffrey G.; Costain, Cameron T.; and Wilson, David A., 5,491,259, Cl. 562-554.000.
Hefner, Robert E., Jr.; and Earls, Jimmy D., 5,491,201, Cl. 525-420.000.
Helmer, Bradley J.; Loughney, Shirley J.; and MacDonagh-Dumler, Jon, 5,491,209, Cl. 526-320.000.
Henton, David E.; Chen, Augustin; Moses, Paul J.; Ehrlich, Benjamin S.; and Beyer, Douglas E., 5,491,194, Cl. 525-66.000.
LaPack, Mark A.; Nestrick, Terry J.; Martin, William F.; and Klecka, Gary M., 5,490,933, Cl. 210-603.000.
Martin, Patrick H.; Bales, Stephen E.; Kim, Peter K.; and Wessling, Ritchie A., 5,490,967, Cl. 264-322.000.
Miyazaki, Yoshiaki; and Mizumura, Kazuo, 5,491,175, Cl. 521-137.000.
Pressnall, Dana W.; Polishak, Jeffery T.; Felix, Bradley K.; Durisin, Michael J.; and Ellison, Joseph, 5,491,625, Cl. 364-133.000.
Rooney, Peter C.; and Nutt, Michael O., 5,491,263, Cl. 564-369.000.
Rosen, Robert K.; and Devore, David D., 5,491,246, Cl. 556-7.000.
Schrader, David; Soderquist, Mark E.; and Heires, Mark D., 5,491,195, Cl. 525-71.000.
Shankar, Ravi B.; Pews, R. Garth; and Romer, Duane R., 5,491,155, Cl. 514-362.000.
Stark, Edmund J.; Schultz, John A.; Ecker, Ernest L.; and DeVries, Robert A., 5,491,250, Cl. 556-466.000.

Dow Mitsubishi Kasei Ltd.: *See*—
Miyazaki, Yoshiaki; and Mizumura, Kazuo, 5,491,175, Cl. 521-137.000.

Dowbrands Inc.: *See*—
Klier, John; Strandburg, Gary M.; and Tucker, Christopher J., 5,490,948, Cl. 252-122.000.

Dr. Ing. h.c.F. Porsche AG: *See*—
Foeldi, Tamás; Stehle, Heinz; Heim, Udo; Xuan, Hai T.; and Wuest, Rainer, 5,491,635, Cl. 364-431.100.
Rutschmann, Erwin, 5,490,484, Cl. 123-184.490.

Drägerwerk AG: *See*—
Reichert, Dirk-Stefan; Hahmann, Günther; and Falb, Wolfgang, 5,490,500, Cl. 128-204.130.

Drake, James A.: *See*—
Veronesi, Luciano; and Drake, James A., 5,490,768, Cl. 417-356.000.

Dreco, Inc.: *See*—
Desai, Vinod; and Tesch, Richard E., 5,490,364, Cl. 52-637.000.

Dreifus, David L.: *See*—
Koyamao, Hisasi; Miyata, Koichi; Saito, Kimitsugu; Dreifus, David L.; and Stoner, Brian R., 5,491,348, Cl. 257-66.000.

Drelick, Teresa M. Storage of items. 5,490,712, Cl. 297-188.120.

Dresser-Rand Company: *See*—
Webber, Wayne F.; Seavey, Charles E.; and Griggs, James R., 5,490,771, Cl. 418-104.000.

Drexel Oilfield Services, Inc.: *See*—
Adams, Thomas C., 5,490,598, Cl. 209-401.000.

Driesen, Georges: *See*—
Weller, Albrecht; Driesen, Georges; Peter, Andreas; Herber, Peter; Schäfer, Gerhard; Schamberg, Stefan; and Birk, Andreas, 5,490,448, Cl. 99-305.000.

Driftmyer, James F.; Jessen, Robert F.; and Melnyk, George, to International Business Machines Corporation. Ribbon tension control with dynamic braking and variable current sink. 5,490,638, Cl. 242-421.000.

Driscoll, Edward K.; Nigro, Arthur R.; and Fillio, Thomas D., to Data General Corporation. Disk array subsystem for use in a data processing system. 5,490,723, Cl. 312-334.280.

Droeser, Walter; and Ekholm, Hans, to Filippa I Vasteras Handesbolag. Roller brush for sweeping machines. 5,490,301, Cl. 15-183.000.

Droutsas, Christos F., to National Semiconductor Corporation. Multi-rail tension equalizer. 5,490,639, Cl. 242-525.100.

Dru B.V.: *See*—
Meijer, Willem, 5,490,778, Cl. 431-349.000.

Druecke, Frank G.: *See*—
Chen, Franklin M. C.; and Druecke, Frank G., 5,490,903, Cl. 162-111.000.

Du Pont de Nemours, E. I., and Company: *See*—
Arentzen, Rene; Jadhav, Prabhakar K.; Kobos, Robert K.; and Smart, Bruce E., 5,491,083, Cl. 435-181.000.
Chen, John C., 5,491,191, Cl. 524-576.000.
Fahmy, Mohamed A. H.; Harrison, Charles R.; Lahm, George P.; and Stevenson, Thomas M., 5,491,162, Cl. 514-403.000.
Herkes, Frank E.; and Kourtakis, Kostantinos, 5,491,264, Cl. 558-431.000.
Hormadaly, Jacob, 5,491,118, Cl. 501-20.000.
Rennie, Foster W.; Chao, Tze; Eastham, Donald H.; and Tarbell, James V., 5,490,976, Cl. 423-658.500.
Selby, Thomas P., 5,491,126, Cl. 504-228.000.

Du Pont Merck Pharmaceutical Company, The: *See*—
Jadhav, Prabhakar K., 5,491,149, Cl. 514-307.000.
Wilde, Richard G.; Ko, Soo S.; and Billheimer, Jeffrey T., 5,491,152, Cl. 514-336.000.

Duce, Richard W.; Quinn, David B.; and McCauley, Kathryn M., to General Motors Corporation. Exhaust sensor with removable electrical connector. 5,490,412, Cl. 73-23.310.

Duchatsch, Günther: *See*—
Leupold, Ernst I.; Kaufmann, Wolf-Dietmar; Laugwitz, Bernd; Duchatsch, Günther; and Meyer-Blumenroth, Ulrich, 5,490,936, Cl. 210-636.000.

Dudar, Tom: *See*—
Finley, Mike; Scharf, Mike; Packard, Jeff; Kipp, Jim; Dudar, Tom; Owens, Jim; and Bindokas, Al, 5,490,848, Cl. 604-403.000.

Dudek, David M.: *See*—
Radosav, Jon J.; Dudek, David M.; Browar, Orest T.; and Ralle, Angelo G., 5,490,682, Cl. 277-815.000.

Duel Systems: *See*—
Farquhar, Jim; Dorf, Ken; Weibezahn, Brandt; Fajardo, Iggoni; and Centofante, Charlie, 5,490,891, Cl. 156-73.100.

Duke, James D.: *See*—
Ellis, Darwin L.; Duke, James D.; and Willis, David A., 5,490,369, Cl. 53-317.000.

Duke, Steve: *See*—
Ritch, James L., 5,490,668, Cl. 273-55.00B.

Dumond, Gilbert. Squirrel-inhibiting shield for a bird feeder. 5,490,480, Cl. 119-57.900.

Dunigan, Robert C.: *See*—
Cooper, David L.; Dunigan, Robert C.; Grenier, Joseph M.; and Lee, Eric G., 5,491,373, Cl. 310-235.000.

Dunn, Mark E.: *See*—
Paulson, John W.; Weisbrod, Stephen P.; and Dunn, Mark E., 5,491,751, Cl. 380-25.000.

Duracell Inc.: *See*—
DePalma, Christopher L.; McHugh, William T.; Sargeant, Sean A.; Wiacek, Marian; and Yoppolo, Robert A., 5,491,038, Cl. 429-91.000.
Parker, Robert, 5,491,420, Cl. 324-435.000.

Durand-Raute Industries Ltd.: *See*—
Puranen, Jussi E. T., 5,490,548, Cl. 144-356.000.

Durgin, Bruce I. Multipin connector apparatus. 5,490,797, Cl. 439-310.000.

Durisin, Michael J.: *See*—
Pressnall, Dana W.; Polishak, Jeffery T.; Felix, Bradley K.; Durisin, Michael J.; and Ellison, Joseph, 5,491,625, Cl. 364-133.000.

Duron, James R., to Quantum Lerning Systems, Inc. Interactive laser disc system. 5,491,704, Cl. 371-40.100.

Dürr, Dieter, to Linde Aktiengesellschaft. Metering of liquid substances. 5,490,428, Cl. 73-861.410.

Dürschmidt, Ferry; and Strauss, Wolfgang, to Mercedes-Benz AG. Method for detecting leaks in a motor vehicle tank ventilation system. 5,490,414, Cl. 73-49.200.

Durst, David I.: *See*—
Gartenberg, Alvin; and Durst, David I., 5,491,334, Cl. 250-227.210.

Dutton, James C.: *See*—
Stephens, Rocky C.; and Dutton, James C., 5,490,783, Cl. 434-35.000.

Duty, Earl A. Suction mounted work light. 5,491,621, Cl. 362-397.000.

Dwyer, Douglas A.: *See*—
Kwok, Peter W.; Feldman, Ira R.; and Dwyer, Douglas A., 5,491,713, Cl. 375-333.000.

Dye, Kipp K.: *See*—
Awbrey, Brian J.; and Dye, Kipp K., 5,490,823, Cl. 482-55.000.

Dykeman, Harold D.: *See*—
Britton, Kathryn H.; Chung, Tein-Yaw; Doeringer, Willibald; Dykeman, Harold D.; Edwards, Allan K.; Mathew, Johny; Pozefsky, Diane P.; Sarkar, Soumitra; and Turner, Roger D., 5,491,693, Cl. 370-85.130.

Dyna Image Corporation: *See*—
Cheng, Cheden; Huang, Shih S.; Ko, Tsung M.; and Su, Hsin C., 5,491,384, Cl. 315-169.300.

Dynex/Rivett, Inc.: *See*—
Claas, Anthony M., 5,490,444, Cl. 92-71.000.

Dyno Nobel Inc.: *See*—
Cranney, Don H.; Lawrence, Lawrence D.; and Jackson, Michael M., 5,490,887, Cl. 149-2.000.

Dzung, John C.: *See*—
de la Luz, Juan B.; Dzung, John C.; Hernandez, Orlando; and Beasley, Jeff R., 5,491,478, Cl. 341-22.000.

D2B Systems Company Limited: *See*—
Welmer, Harm J., 5,491,805, Cl. 395-284.000.

Eagle Engineering and Manufacturing, Inc.: *See*—
Pichotta, Andrew J., 5,490,556, Cl. 165-26.000.

Earle, Anthony; Graebe, Christopher M.; Glover, Edward C. T. S.; Skye, David A.; Taylor, Nicholas J.; and Ward, Paul C., to Eastman Kodak Company. Processing of photographic film. 5,491,530, Cl. 354-313.000.

Earls, Jimmy D.: *See*—
Hefner, Robert E., Jr.; and Earls, Jimmy D., 5,491,201, Cl. 525-420.000.

Earnest, Edward M.: *See*—
Van de Geijn, Peter T.; Bealer, Kenneth H.; Earnest, Edward M.; Kuykendall, Kenneth H., Sr.; and Maccherone, Larry S., 5,490,827, Cl. 493-109.000.

Eastham, Donald H.: *See*—
Rennie, Foster W.; Chao, Tze; Eastham, Donald H.; and Tarbell, James V., 5,490,976, Cl. 423-658.500.

Eastman Kodak Company: *See*—
Allway, Philip A., 5,491,049, Cl. 430-379.000.
Anderson, Ernest R.; and Lowery, Stephen N., 5,491,048, Cl. 430-347.000.
Barber, Gary N.; Greco, Patricia R.; Bogdanowicz, Mitchell J.; and Kelly, Elizabeth L., 5,491,053, Cl. 430-549.000.
Brust, Thomas B.; Gould, Sharon; Sutton, James E.; and Szajewski, Richard P., 5,491,050, Cl. 430-380.000.
DeBoer, Charles D.; Henzel, Richard P.; Neumann, Stephen M.; and Tutt, Lee W., 5,491,045, Cl. 430-200.000.
DeBoer, Charles D.; and Haley, Neil F., 5,491,046, Cl. 430-302.000.
DeCory, John F.; James, Robert O.; Tingler, Kenneth L.; and Wexler, Ronald M., 5,491,051, Cl. 430-496.000.
Dohmeier, Steven C.; and Gage, Edward C., 5,491,682, Cl. 369-124.000.
Earle, Anthony; Graebe, Christopher M.; Glover, Edward C. T. S.; Skye, David A.; Taylor, Nicholas J.; and Ward, Paul C., 5,491,530, Cl. 354-313.000.
Hamilton, John F.; and Leone, Anthony J., 5,491,558, Cl. 358-298.000.
Jain, Rakesh; Schleigh, William R.; and Stewart, Robert C., 5,491,054, Cl. 430-551.000.
Jones, Ralph W.; Wideman, Catherine C.; and Twombly, Paul W., 5,491,058, Cl. 430-596.000.
Kay, David B., 5,491,675, Cl. 369-44.230.
Kim, Sang H., 5,491,055, Cl. 430-567.000.
Nagao, Kagenori; Takizawa, Yoshinori; and Matsumoto, Naoko, 5,491,759, Cl. 382-199.000.
Schindler, Roland R., 5,491,493, Cl. 395-110.000.
Spadafora, V. James; Brady, Thomas E.; and Motoyoshi, Masatoshi, 5,491,157, Cl. 514-369.000.
Van Meter, James P.; Bagchi, Pranab; Thomas, Brian; and Rosiek, Thomas A., 5,491,052, Cl. 430-545.000.
Wan, Shijie, 5,491,568, Cl. 358-518.000.
Wen, Xin; and Lok, Roger, 5,491,056, Cl. 430-569.000.
Wilson, John C.; and Tyagi, Dinesh, 5,491,044, Cl. 430-110.000.

Eaton Corporation: *See*—
Genise, Thomas A.; and Markyvech, Ronald K., 5,491,630, Cl. 364-424.100.

Eaton, Michael A. W.: *See*—
Boyd, Ewan C.; Eaton, Michael A. W.; and Warrellow, Graham J., 5,491,147, Cl. 514-247.000.

Eaton Tennessee, Inc.: *See*—
Bartell, Robert J.; and Kern, Calvin V., 5,490,721, Cl. 303-116.400.

Ebara Corporation: *See*—
Nakamura, Toshio; Soeda, Yoshimi; Miyasaka, Toshifumi; and Iwata, Minoru, 5,490,319, Cl. 29-596.000.

Ebert, Harald: *See*—
Scheuermann, Kurt; and Ebert, Harald, 5,491,699, Cl. 371-22.100.

Echelon Corporation: *See*—
Small, Kenneth T., 5,491,402, Cl. 323-282.000.

Echo Incorporated: *See*—
Potucek, Frank R., III, 5,490,371, Cl. 56-17.200.

Ecker, Ernest L.: *See*—
Stark, Edmund J.; Schultz, John A.; Ecker, Ernest L.; and DeVries, Robert A., 5,491,250, Cl. 556-466.000.

Eckhardt, Dennis C.: *See*—
Pawlak, Andrzej M.; Lin, William C.; Graber, David W.; Eckhardt, Dennis C.; Weiss, Scott E.; Radamis, Maged; Perry, Thomas A.; and Bradley, John R., 5,491,632, Cl. 364-424.050.

Economikos, Laertis; Hannon, Robert; and Surprenant, Richard P., to International Business Machines Corporation. Laser ablation apparatus and method. 5,491,319, Cl. 219-121.690.

Eder, Erich, to Krones AG Hermann Kronseder Maschinenfabrik. Container with a label adhered to the container. 5,491,010, Cl. 428-35.700.

Eder, Paul S.: *See*—
Walder, Joseph A.; Walder, Roxanne Y.; Eder, Paul S.; and Dagle, John M., 5,491,133, Cl. 514-44.000.

Edison Polymer Innovation Corporation: *See*—
Harris, Frank W.; and Ding, Hong, 5,491,200, Cl. 525-419.000.

Edwards, Allan K.: *See*—
Britton, Kathryn H.; Chung, Tein-Yaw; Doeringer, Willibald; Dykeman, Harold D.; Edwards, Allan K.; Mathew, Johny; Pozefsky, Diane P.; Sarkar, Soumitra; and Turner, Roger D., 5,491,693, Cl. 370-85.130.

Edwards, Harry W.: *See*—
Cole, George S.; and Edwards, Harry W., 5,490,536, Cl. 137-315.000.

Edwards, Jonathan: *See*—
May, Michael D.; Edwards, Jonathan; and Waller, David L., 5,491,359, Cl. 257-373.000.

Egan, Patrick K.; and Ohnstad, Gene A., to International Business Machines Corporation. Method and system for management of units within a data processing system. 5,491,786, Cl. 395-180.000.

Eggers, Frederick W.: *See—*
Tracy, Lawrence R.; Eggers, Frederick W.; Houston, David; Wallace, Walter B.; and Bamford, Jeffrey, 5,491,467, Cl. 340-522.000.

Ehrlich, Benjamin S.: *See—*
Henton, David E.; Chen, Augustin; Moses, Paul J.; Ehrlich, Benjamin S.; and Beyer, Douglas E., 5,491,194, Cl. 525-66.000.

EIC Laboratories, Inc.: *See—*
Abraham, Kuzhikalail M.; Alamgir, Mohamed; and Jiang, Zhiping, 5,491,041, Cl. 429-212.000.

Eicken, Ulrich; Mathis, Raymond; Fiedler, Heidi; and Gorzinski, Manfred, to Henkel Kommanditgesellschaft auf Aktien. Spinning preparations in the form of aqueous emulsions or aqueous solutions containing polymers. 5,490,943, Cl. 252-8.600.

Eigendorf, Hans-Günter, to Medical Support GmbH. Assembly for the on-line flushing and filling of an extracorporeal blood circulation system of dialysis machines. 5,490,925, Cl. 210-321.690.

Eiichiro, Aoki, to Yamaha Corporation. Automatic accompaniment apparatus determining an inversion type chord based on a reference part sound. 5,491,298, Cl. 84-656.000.

Eisenschenk, Johann; and Krinner, Klaus, to Krinner GmbH. Tree stand. 5,490,350, Cl. 47-40.500.

Eisinger, Magdalena: *See—*
Seddon, Andrew P.; Li, Luyuan; Böhlen, Peter; Eisinger, Magdalena; and Yayon, Avner, 5,491,220, Cl. 530-399.000.

Ekholm, Hans: *See—*
Droeser, Walter; and Ekholm, Hans, 5,490,301, Cl. 15-183.000.

Electro-Pro, Inc.: *See—*
Skell, Daniel G.; Skell, Eric D.; and Manthei, Michael A., 5,491,333, Cl. 250-222.100.

Elf Atochem North America, Inc.: *See—*
Gernon, Michael D., 5,491,247, Cl. 556-113.000.

Elger, Walter: *See—*
Bull, James R.; Elger, Walter; Fritzemeier, Karl-Heinrich; and Krattenmacher, Rolf, 5,491,137, Cl. 514-182.000.

Eli Lilly and Company: *See—*
Berglund, Richard A., 5,491,243, Cl. 549-75.000.
Bruns, Robert F., Jr.; Gehlert, Donald R.; Howbert, J. Jeffry; and Lunn, William H. W., 5,491,140, Cl. 514-212.000.
Gillig, James R.; and Jirousek, Michael R., 5,491,242, Cl. 548-455.000.
Hoffmann, James A.; and Lambooy, Peter K., 5,491,216, Cl. 530-303.000.
Kaldor, Stephen W.; and Mabry, Thomas E., 5,491,166, Cl. 514-481.000.
Monn, James A., 5,491,241, Cl. 548-452.000.
Sportsman, J. Richard, 5,491,096, Cl. 436-518.000.

Elitex ÚSTÍ Nad Orlicí: *See—*
Špindler, Zdeněk; Burýšek, František; Němec, Jiří; Novotný, Vojtěch; Lásko, Josef; Blasel, Miroslav; and Talacko, Oldřich, 5,490,375, Cl. 57-263.000.

Elizabeth Arden Company, Division of Conopco, Inc.: *See—*
Hagan, Desmond B.; and Carter, Peter, 5,490,955, Cl. 252-554.000.
Siciliano, Marcina, 5,490,982, Cl. 424-401.000.

Ellenberger & Poensgen GmbH: *See—*
Krasser, Fritz; and Schmidt, Wolfgang, 5,491,460, Cl. 337-70.000.

Elliott, Laura D.: *See—*
Nuñez, Ivan M.; Molock, Frank F.; Elliott, Laura D.; and Ford, James D., 5,490,960, Cl. 264-2.600.
Nuñez, Ivan M.; Molock, Frank F.; Elliott, Laura D.; and Ford, James D., 5,490,959, Cl. 264-2.600.

Ellis, Clifford J.; and Everett, Rob D., to Kimberly-Clark Corporation. Surge management fibrous nonwoven web for personal care absorbent articles and the like. 5,490,846, Cl. 604-366.000.

Ellis, Darwin L.; Duke, James D.; and Willis, David A., to Aluminum Company of America. Capping head with magnetic clutch. 5,490,369, Cl. 53-317.000.

Ellis, Roy D.; and Maurath, Steven E., to Activator Systems, Inc. Automated key actuating cellular telephone programmer. 5,491,740, Cl. 379-58.000.

Ellison, Joseph: *See—*
Pressnall, Dana W.; Polishak, Jeffery T.; Felix, Bradley K.; Durisin, Michael J.; and Ellison, Joseph, 5,491,625, Cl. 364-133.000.

Ellman, Alan G.; and Garito, Jon C. Graft harvesting hair transplants with electrosurgery. 5,490,850, Cl. 606-45.000.

Elm, Dana D.: *See—*
Zamost, Bruce L.; and Elm, Dana D., 5,491,087, Cl. 435-200.000.

Elmotec GmbH: *See—*
Kleinschmidt, Dieter, 5,490,318, Cl. 29-596.000.

Elveco nsj S.A.: *See—*
Lhoest, Willy, 5,490,546, Cl. 141-346.000.

EMC Technology, Inc.: *See—*
Mazzochette, Joseph B., 5,490,788, Cl. 439-83.000.

Emhart Inc.: *See—*
Smith, Daniel R., 5,490,312, Cl. 29-243.525.
Zuckerman, Martin, 5,490,700, Cl. 292-357.000.

Endgate Technology Corporation: *See—*
Johnson, Edwin F.; Lockie, Douglas G.; and Mohwinkel, Clifford A., 5,491,449, Cl. 330-269.000.

Endo, Kazuhito; and Ishida, Masayuki, to Mitsubishi Denki Kabushiki Kaisha. Rotary head recording and playback apparatus and method. 5,491,590, Cl. 360-19.100.

Endoh, Shigeru: *See—*
Kamiyama, Takao; Yokoshima, Yasuhiro; and Endoh, Shigeru, 5,490,964, Cl. 264-36.000.

Eng, Anthony T.: *See—*
Hegedus, Charles R.; Hirst, Donald J.; and Eng, Anthony T., 5,491,185, Cl. 523-451.000.

Eng, Kan K.: *See—*
Askin, David; Volante, Ralph P.; and Eng, Kan K., 5,491,238, Cl. 546-270.000.

Engel, William K., to Caterpillar Inc. Apparatus and method for a piston assembly. 5,490,446, Cl. 92-157.000.

Engelhard Corporation: *See—*
Voss, Kenneth E.; Yavuz, Bulent O.; Farrauto, Robert J.; and Galligan, Michael P., 5,491,120, Cl. 502-304.000.
Wan, Chung-Zong; Tauster, Samuel J.; and Rabinowitz, Harold N., 5,490,977, Cl. 423-210.000.

Engelking, Steven; and Sanchez, Robert R., to Sony Corporation; and Sony Electronics Inc. Apparatus and method for neutralizing a contaminated heating element. 5,491,282, Cl. 588-261.000.

English, Thomas C., to Ball Corporation. Method and apparatus for reduction of atomic frequency standard phase noise. 5,491,451, Cl. 331-3.000.

Enichem Elastomeri S.R.L.: *See—*
Custro, Sergio; and Viola, Gian L., 5,491,197, Cl. 525-332.800.
Tanaglia, Tiziaao; Banzi, Viviano; and Zecchi, Elisa, 5,491,208, Cl. 526-143.000.

Enricerche S.p.A.: *See—*
Prevedello, Aldo; and Romano, Goffredo, 5,490,877, Cl. 106-668.000.

Enlow, Howard H.; Huffer, Scott W.; Young, Frederick; and Buehne, William J., to Avery Dennison Corporation. Thermoformable conductive laminate and process. 5,490,893, Cl. 156-230.000.

Enriquez, Philip; Jung, Chu W.; and Groman, Ernest V., to Advanced Magnetics, Inc. Directed delivery of radioprotectants using a receptor specific carrier. 5,490,991, Cl. 424-488.000.

Enzymol International, Inc.: *See—*
Pokora, Alexander R.; and Johnson, Mark A., 5,491,085, Cl. 435-192.000.

Equipement Industriel Normand France: *See—*
Coquerel, Michel; and Coquerel, Philippe, 5,490,612, Cl. 222-25.000.

Erhart, Timothy A., to Exlar Corporation. Electric linear actuator with planetary action. 5,491,372, Cl. 310-80.000.

Erickson, James R., to Shell Oil Company. Crosslinked epoxy functionalized polydiene block polymers and adhesives. 5,491,193, Cl. 525-65.000.

Erico International Corporation: *See—*
Assel, Mark; and Whetsel, James E., 5,490,888, Cl. 149-37.000.

Ericsson Inc.: *See—*
Haartsen, Jacobus C., 5,491,837, Cl. 455-62.000.

Eriguchi, Hiroyasu; Nishimura, Hiroshi; Yamamoto, Minoru; Iwahori, Yutaka; and Kamoi, Takeshi, to Matsushita Electric Works, Ltd. Stable high frequency high-pressure discharge lamp lighting device avoiding acoustic resonance. 5,491,386, Cl. 315-209.00R.

Errico, James H.: *See—*
Maher, John W.; and Errico, James H., 5,491,689, Cl. 370-58.100.

Erskine, Stephen P. E. Production of anaglyphs. 5,491,646, Cl. 364-526.000.

Essig, Mitchell N.: *See—*
Wilk, Peter J.; and Essig, Mitchell N., 5,490,507, Cl. 128-653.100.

Estaque, Michel; and Gernot, Philippe, to Labavia - S.G.E. Eddy current brake equipment with torque estimation. 5,490,584, Cl. 188-164.000.

Ethicon, Inc.: *See—*
Hildwein, Roger L.; Uschold, Robert C.; Staley, J. D., Jr.; Riestenberg, Paul; Gallagher, Laura; and Nagao, Rex, 5,490,843, Cl. 604-164.000.

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Gilbert, Jérôme, 5,491,473, Cl. 340-870.010.

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Erhart, Timothy A., 5,491,372, Cl. 310-80.000.

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Bragg, James R.; and Yang, Shan H., 5,490,940, Cl. 210-671.000.
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Thompson, Michael I.; Congdon, Paul T.; Burnett, John L.; Fiduccia, Frank, deceased, 5,491,802, Cl. 395-200.180.

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Strong, Finn A., 5,490,481, Cl. 119-259.000.

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Purser, Robert W., 5,490,566, Cl. 169-26.000.

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Naokawa, Toyojiro; and Fujii, Katsushige, 5,491,448, Cl. 330-264.000.

Fujimoto, Manabu: *See*—
Nojima, Hideo; Shintaku, Hidetaka; Nagata, Masaya; Fujimoto, Manabu; and Koba, Masayoshi, 5,491,410, Cl. 324-248.000.

Fujino, Yoshiyuki: *See*—
Hirose, Toshihiko; Ohbayashi, Shigeki; Kondo, Setsu; Hayasaka, Takashi; Fujino, Yoshiyuki; and Iketani, Masayuki, 5,491,655, Cl. 365-177.000.

Fujisawa Pharmaceutical Co., Ltd.: *See*—
Hemmi, Keiji; Neya, Masahiro; Marusawa, Hiroshi; Watanabe, Shinya; and Hashimoto, Masashi, 5,491,132, Cl. 514-18.000.

Fujisawa, Shigenobu, to Nippon Filcon Co., Ltd. Two-ply warp two-ply weft papermaking fabric having auxiliary weft yarns incorporated in papermaking side fabric. 5,490,543, Cl. 139-383.00A.

Fujita, Masayuki, to NEC Corporation. Light-receiving module. 5,491,582, Cl. 359-341.000.

Fujitsu Limited: *See*—
Hoshino, Masataka, 5,491,005, Cl. 427-576.000.
Matoba, Tatsuo; and Yorimitsu, Keiichi, 5,491,816, Cl. 395-181.000.
Morikawa, Shuichi; Futatsuka, Masahiko; Ishida, Satoshi; Miyauchi, Yasunori; Masuda, Minoru; and Takagawa, Makoto, 5,491,567, Cl. 358-498.000.
Nishimura, Koichi, 5,491,696, Cl. 370-16.100.
Ohara, Yasuko, 5,491,572, Cl. 359-110.000.
Sato, Kenji, 5,491,686, Cl. 370-16.100.
Sato, Shinichi; Kumagai, Toshimitsu; Iwaguchi, Isao; and Shinoda, Ichiro, 5,491,330, Cl. 250-214.0AL.
Somasundaram, M.; Watanabe, Akira; Huey, James D.; and Maheshwari, Dinesh, 5,491,793, Cl. 395-183.210.
Yamamoto, Hiroshi, 5,491,368, Cl. 307-113.000.

Fujitsu Ten Limited: *See*—
Ueyanagi, Katsumichi, 5,490,421, Cl. 73-514.330.

Fujiura, Yoshitsugu: *See*—
Yamada, Shoji; and Fujiura, Yoshitsugu, 5,490,791, Cl. 439-159.000.

Fujiwara Industrial Co., Ltd.: *See*—
Matsumoto, Tadahisa, 5,490,777, Cl. 431-344.000.

Fukai, Isamu: *See*—
Kanou, Hiroshi; Terauchi, Kiyoshi; Fukai, Isamu; and Ogura, Toshiyuki, 5,490,767, Cl. 417-222.100.

Fukuda, Hideki; Honjo, Masahiro; and Shibata, Hideaki, to Matsushita Electric Industrial Co., Ltd. Coding apparatus, decoding apparatus, coding-decoding apparatus for video signals, and optical disks conforming thereto. 5,491,514, Cl. 348-397.000.

Fukuda, Hideki, to Matsushita Electric Industrial Co., Ltd. Image processor for processing high definition image signal and standard image signal and disk apparatus therefor. 5,491,561, Cl. 358-342.000.

Fukumoto, Toshiyuki: *See*—
Sato, Yuji; Fukumoto, Toshiyuki; Imamura, Yoshifumi; and Honjo, Toshio, 5,491,042, Cl. 430-108.000.

Fukunaga, Hideki: *See*—
Seko, Yasuji; Otoma, Hiromi; Ueki, Nobuaki; Fukunaga, Hideki; Nakayama, Hideo; Ueyanagi, Kiichi; and Shiraki, Yasuhiro, 5,491,709, Cl. 372-45.000.

Fukuoka Kagaku Ltd.: *See*—
Fukuoka, Masahiro, 5,490,713, Cl. 297-217.300.

Fukuoka, Masahiro, to Fukuoka Kagaku Ltd. Apparatus for vibrating seats. 5,490,713, Cl. 297-217.300.

Fukushima, Yasuo: *See*—
Takahashi, Naohiko; Hiroshima, Minoru; Matsushita, Osami; and Fukushima, Yasuo, 5,491,396, Cl. 318-632.000.

Fulks, Ronald T.: *See*—
Allen, Robert R., deceased; Bruce, Richard H.; Chuang, Tzu-Chin; Fiske, Thomas G.; Fulks, Ronald T.; Hack, Michael; Ho, Jackson H.; Lewis, Alan G.; Martin, Russel A.; Silverstein, Louis D.; Steemers, Hugo L.; Stuber, Susan M.; Thompson, Malcolm J.; Turner, William D.; and Yao, William W., 5,491,347, Cl. 257-59.000.

Furman, Gary S.: *See*—
Jansma, Roger H.; Begala, A. James; and Furman, Gary S., 5,490,904, Cl. 162-168.200.

Furukawa Electric Co., Ltd., The: *See*—
Mand, Ranjit S.; Ijichi, Tetsuro; and Xu, Jingming, 5,491,711, Cl. 372-49.000.

Fusaro, Angelo: *See*—
Galeazzi, Giancarlo; and Fusaro, Angelo, 5,490,355, Cl. 52-29.000.

Futatsuka, Masahiko: *See*—
Morikawa, Shuichi; Futatsuka, Masahiko; Ishida, Satoshi; Miyauchi, Yasunori; Masuda, Minoru; and Takagawa, Makoto, 5,491,567, Cl. 358-498.000.

Fuwa, Tetsuji, to Brother Kogyo Kabushiki Kaisha. Stencil-producing apparatus. 5,491,503, Cl. 347-171.000.

Fyles, Anthony; Key, Andrew; and Sethi, Vincent, to International Business Machines Corporation. System and method for efficient computer workstation screen updates. 5,491,780, Cl. 395-153.000.

Gadtke, David W.: *See*—
Isaacson, Philip O.; Gadtke, David W.; and Johnson, Timothy L., 5,490,523, Cl. 128-633.000.

Gaffuri, Jean-Gilles: *See*—
Bouraly, Jean-Pierre; Aebi, Jurg; Beaufils, Philippe; de Lestang, Michel; Gaffuri, Jean-Gilles; Hourlier, Hervé; Lallement, Jean-Jacques; Legroux, Philippe; Levai, Jean-Paul; Pondaven, Gérald; Schuster, Pierre; and Vergnat, Christian, 5,490,855, Cl. 606-88.000.

Gage, Edward C.: *See*—
Dohmeier, Steven C.; and Gage, Edward C., 5,491,682, Cl. 369-124.000.

Gagliardi, Louis R.: *See*—
Cepulis, Darren J.; and Gagliardi, Louis R., 5,491,788, Cl. 395-182.110.

Gaigl, Karl-Josef. Apparatus for introducing articles into and/or removing articles from a machine. 5,490,772, Cl. 425-126.100.

Galand, Claude: *See*—
Alfonsi, Jean-Pierre; Galand, Claude; Lebizay, Gerald; and Maurel, Olivier, 5,491,690, Cl. 370-60.000.

Galeazzi, Giancarlo; and Fusaro, Angelo. Waste collection device. 5,490,355, Cl. 52-29.000.

Gallagher, Laura: *See*—
Hildwein, Roger L.; Uschold, Robert C.; Staley, J. D., Jr.; Riestenberg, Paul; Gallagher, Laura; and Nagao, Rex, 5,490,843, Cl. 604-164.000.

Galligan, Michael P.: *See*—
Voss, Kenneth E.; Yavuz, Bulent O.; Farrauto, Robert J.; and Galligan, Michael P., 5,491,120, Cl. 502-304.000.

Gammack, Richard J.: *See*—
Barnaby, Catherine L.; Gammack, Richard J.; and Stansfield, Anthony I., 5,491,703, Cl. 371-40.100.

Gamo, Takaharu; Moriwaki, Yoshio; Iwaki, Tsutomu; and Shintani, Akemi, to Matsushita Electric Industrial Co., Ltd. Method of producing hydrogen-storing alloy and electrode making use of the alloy. 5,490,970, Cl. 420-424.000.

Garandel, René: *See*—
Tremel, Jean-Yves; Garandel, René; and Jan, Yves, 5,491,697, Cl. 371-5.100.

Garito, Jon C.: *See*—
Ellman, Alan G.; and Garito, Jon C., 5,490,850, Cl. 606-45.000.

Garner, Brett R.; and Lee, Russell P., to Morton International, Inc. Reaction can to cover joining method. 5,490,689, Cl. 280-728.200.

Garrity, George M.: *See*—
Chartrain, Michel M.; Chen, Shieh-Shung T.; Garrity, George M.; Heimbuch, Brian; Roberge, Christopher; and Shafiee, Ali, 5,491,077, Cl. 435-118.000.

Gartenberg, Alvin; and Durst, David L., to Grumman Aerospace Corporation. Magneto-optical input system for infrared detectors. 5,491,334, Cl. 250-227.210.

Gasparik, Frank, to AT&T Global Information Solutions Company; Hyundai Electronics America; and Symbios Logic Inc. Apparatus for reducing current consumption in a CMOS inverter circuit. 5,491,429, Cl. 326-27.000.

Gasperina, Marco D., to Hewlett-Packard Company. Method and apparatus for displaying a graphic image. 5,491,781, Cl. 395-157.000.

Gasser, Morrie: *See—*
Kaufman, Charles W.; Pearlman, Radia J.; and Gasser, Morrie, 5,491,752, Cl. 380-30.000.

Gasworth, Steven M.: *See—*
Fleischer, James F.; and Gasworth, Steven M., 5,490,963, Cl. 264-400.000.

Gautheron, Olivier; and Coeurjolly, Christian, to Alcatel CIT. Tunable optical filter tuning device suitable for use in the receive part of an optical transmission system. 5,491,577, Cl. 359-194.000.

Gaylo, Christopher M.: *See—*
Abrams, Andrew L.; and Gaylo, Christopher M., 5,490,763, Cl. 415-206.000.

GE Yokogawa Medical Systems, Ltd: *See—*
Amemiya, Shinichi; and Suzuki, Yoichi, 5,490,511, Cl. 128-660.010.

Geatz, J. Tobin: *See—*
Bernosky, Eugene W.; Geatz, J. Tobin; Ferrie, Edward T., Jr.; and Roberson, Glenn A., Jr., 5,490,611, Cl. 222-1.000.

Gebhard, Albert W.: *See—*
Mallookis, Steven E.; and Gebhard, Albert W., 5,490,532, Cl. 135-117.000.

Gebhart, Walter M., to Phillips Kiln Service Company of Canada, Ltd. Triple laser rotary kiln alignment system. 5,491,553, Cl. 356-375.000.

GEC-Marconi Limited: *See—*
Shipley, Simon P., 5,491,574, Cl. 359-110.000.

Gehlert, Donald R.: *See—*
Bruns, Robert F., Jr.; Gehlert, Donald R.; Howbert, J. Jeffry; and Lunn, William H. W., 5,491,140, Cl. 514-212.000.

Geist, James F., Jr., to Conner Peripherals, Inc. Method for tracking memory allocation in network file server. 5,491,808, Cl. 395-427.000.

Gelfand, David H.; and Wang, Alice M., to Hoffmann-La Roche Inc. Purified thermostable nucleic acid polymerase and DNA coding sequences from pyrodictium species. 5,491,086, Cl. 435-194.000.

Gelm, John R.: *See—*
Gould, Adam F.; Robertson, James R.; Noneman, John W.; and Gelm, John R., 5,491,718, Cl. 375-205.000.

GenCorp. Inc.: *See—*
McBain, Douglas S.; Melby, Earl G.; and LaJudice, Kevin P., 5,491,184, Cl. 523-436.000.

Genentech, Inc.: *See—*
van Reis, Robert D., 5,490,937, Cl. 210-637.000.

General Electric Company: *See—*
Bewlay, Bernard P.; and Dalpe, Dennis J., 5,490,969, Cl. 419-68.000.
Cipullo, Michael J., 5,491,268, Cl. 568-758.000.
Fleischer, James F.; and Gasworth, Steven M., 5,490,963, Cl. 264-400.000.
Hapeman, Martin J., 5,490,748, Cl. 410-64.000.
Hsieh, Jiang, 5,491,735, Cl. 378-15.000.
Schilling, Jan C., 5,490,764, Cl. 416-239.000.
Slutz, David E., 5,491,002, Cl. 427-249.000.
Uzgiris, Egidijus E.; Opsahl, Lorinda R.; Vosburgh, Kirby G.; Anthony, Thomas R.; and Cline, Harvey E., 5,490,840, Cl. 604-22.000.
Welles, Kenneth B., II; Tiemann, Jerome J.; and Tomlinson, Harold W., Jr., 5,491,486, Cl. 342-357.000.

General Housewares Corp.: *See—*
Stowell, Davin B.; Ando, Mari H.; and Sica, Vanessa D., 5,490,616, Cl. 222-472.000.

General Motors Corporation: *See—*
Alfaro, Enrique J.; and Frank, Erwin, 5,491,418, Cl. 324-402.000.
Bartley, Robert M.; Conway, Michael E.; and Millard, Harry J., III, 5,491,313, Cl. 200-310.000.
Duce, Richard W.; Quinn, David B.; and McCauley, Kathryn M., 5,490,412, Cl. 73-23.310.
Henry, Rassem R.; Lequesne, Bruno P. B.; and Schroeder, Thaddeus, 5,491,633, Cl. 364-424.050.
Partin, Dale L.; Heremans, Joseph P.; and Green, Louis, 5,491,461, Cl. 338-32.00R.
Pawlak, Andrzej M.; Lin, William C.; Graber, David W.; Eckhardt, Dennis C.; Weiss, Scott E.; Radamis, Maged; Perry, Thomas A.; and Bradley, John R., 5,491,632, Cl. 364-424.050.
Schneider, Eric D.; McMullen, Steven R.; Rajashekara, Kaushik; Loynes, Wayne J.; Boys, William E.; and Martin, Ronald A., 5,491,370, Cl. 310-54.000.

Genet, William. Two cycle engine with piston mounted poppet valve operating mechanism. 5,490,482, Cl. 123-47.00R.

Gengler, Mark S.: *See—*
Williams, Roger D.; and Gengler, Mark S., 5,490,392, Cl. 62-91.000.

Genise, Thomas A.; and Markyvech, Ronald K., to Eaton Corporation. Method/system for resetting the value of a control parameter indicative of gross combined weight of vehicles to a default value thereof. 5,491,630, Cl. 364-424.100.

Genzyme Limited: *See—*
Casson, Robert D.; and Lovelady, John A., 5,491,227, Cl. 536-124.000.

Georg Karl Geka-Brush GmbH: *See—*
Fitjer, Holger, 5,490,529, Cl. 132-218.000.

George, Flint R.: *See—*
Wesson, David; George, Kevin R.; and George, Flint R., 5,490,563, Cl. 166-297.000.

George, Kevin R.: *See—*
Wesson, David; George, Kevin R.; and George, Flint R., 5,490,563, Cl. 166-297.000.

George S. Cole & Associates, Incorporated: *See—*
Cole, George S.; and Edwards, Harry W., 5,490,536, Cl. 137-315.000.

Georgi, Bernd; Czepan, Bernd; and Peter, Heinz, to Carl-Zeiss-Stiftung. Method of controlling a coordinate measuring apparatus. 5,491,638, Cl. 364-474.370.

Georgia Tech Research Corporation: *See—*
Pickering, Leslie W.; Barnhart, Eric N.; Harvey, Bruce A.; and Witten, Michael L., 5,491,644, Cl. 364-514.00R.

Gerdeman, Roger J.: *See—*
Richardson, Orland W.; and Gerdeman, Roger J., 5,490,456, Cl. 101-35.000.

Gerigk, Markus; Brück, Jochen; and Hovestadt, Wieland, to Bayer Aktiengesellschaft. Process for reconcentrating overspray from one-component coating compositions. 5,490,939, Cl. 210-652.000.

Gerlach, Karl R., to United States of America, Navy. Slaved Gram Schmidt adaptive noise cancellation method and apparatus. 5,491,487, Cl. 342-378.000.

Gernon, Michael D., to Elf Atochem North America, Inc. Preparation of a precious metal salt of a nonoxidizing acid by direct reaction. 5,491,247, Cl. 556-113.000.

Gernot, Philippe: *See—*
Estaque, Michel; and Gernot, Philippe, 5,490,584, Cl. 188-164.000.

Gerolimatos, Mark: *See—*
Wanderer, James; Cooper, Claus; Gerolimatos, Mark; and Chen, Michele, 5,491,796, Cl. 395-200.090.

GET, Inc.: *See—*
Kamiyama, Takao; Yokoshima, Yasuhiro; and Endoh, Shigeru, 5,490,964, Cl. 264-36.000.

Gewin, Robert E.: *See—*
Jones, David E.; Gewin, Robert E.; and Jackson, Ronald W., 5,491,722, Cl. 375-224.000.

Giannessi, Fabio; Castagnani, Roberto; Tinti, Maria O.; De Angelis, Francesco; De Witt, Paolo; and Misiti, Domenico, to Sigma-Tau Industrie Farmaceutiche Riunite S.p.A. Process for manufacturing L-(-)-carnitine from derivatives having a configuration opposite to that of L-(-)-carnitine. 5,491,260, Cl. 562-567.000.

Gibbs, Glen A.: *See—*
Iorio, Ralph A.; and Gibbs, Glen A., 5,490,542, Cl. 138-140.000.

Giebel, Michael; Speck, Steven; and Love, Randy, to Sunbeam Products, Inc. Side burner for barbecue grill. 5,490,494, Cl. 126-41.00R.

Gifford, Michael M.; and Mackie, Kevin J., to Sippican, Inc. Chemical detector. 5,490,971, Cl. 422-58.000.

Gigot, Claude: *See—*
Chaubet, Nicole; Gigot, Claude; Freyssinet, Georges; and Leroux, Bernard, 5,491,288, Cl. 800-205.000.

Gilbert, Jérôme, to Euro CP S.A.R.L.; and IMS France. System for remote data collecting, method implemented in this system and data collector device. 5,491,473, Cl. 340-870.010.

Gill, Avtar S., to Caterpillar Inc. Vibration and shock isolated headlight mounting system. 5,491,619, Cl. 362-294.000.

Gillette Company, The: *See—*
Chylinski, Henryk J.; Jacobson, Chester F.; Salisbury, Timothy M.; and Borden, Frederick R., 5,490,329, Cl. 30-49.000.

Gillig, James R.; and Jirousek, Michael R., to Eli Lilly and Company. Protein kinase C inhibitors. 5,491,242, Cl. 548-455.000.

Gingras, Jean-Pierre. Modular panel for right angle interconnection. 5,490,361, Cl. 52-578.000.

Giroux, Eugene L.: *See—*
Flynn, Gary A.; Bey, Philippe; Warshawsky, Alan M.; Beight, Douglas W.; Mehdi, Shujaath; Giroux, Eugene L.; Burkholder, Timothy P.; Daugs, Edward D.; and French, John F., 5,491,143, Cl. 514-214.000.

Gisler, Markus; and Wald, Roland, to Sandoz Ltd. Fibre-reactive copper-complex formazan compounds which contain a difluoropyrimidinyl group. 5,491,221, Cl. 534-618.000.

Giuliano, Mario, to Faema S.p.A. Automatic espresso and cappuccino machine. 5,490,447, Cl. 99-286.000.

Given, Bruce A.: *See—*
Wang, Mansheng; and Given, Bruce A., 5,490,895, Cl. 156-286.000.

Glass, Roger M., to Cone Swallow Inc. Pine cone retriever. 5,490,701, Cl. 294-61.000.

Glaxo Wellcome Inc.: *See—*
Fang, Francis G.; Lowery, Melissa W.; and Xie, Shiping, 5,491,237, Cl. 546-116.000.

Gleckman, Philip L.: *See—*
Winston, Roland; and Gleckman, Philip L., 5,491,620, Cl. 362-346.000.

Global Focus Marketing & Distribution: *See—*
Lovelady, Charles; and Williams, Bert R., III, 5,490,830, Cl. 494-14.000.

Glotzbach, Jörn: *See—*
Müller, Karsten; and Glotzbach, Jörn, 5,490,383, Cl. 60-327.000.

Glover, Edward C. T. S.: *See—*
Earle, Anthony; Graebe, Christopher M.; Glover, Edward C. T. S.; Skye, David A.; Taylor, Nicholas J.; and Ward, Paul C., 5,491,530, Cl. 354-313.000.

Glowny, David A.; Kistenmacher, John C.; Rahn, Caryl M.; and Thomas, Jerry C., to International Business Machines Corporation. System and method for remote workstation monitoring within a distributed computing environment. 5,491,791, Cl. 395-183.130.

Gnade, Bruce E.: *See—*

Levine, Jules D.; Shen, Chi-Cheong; and Gnade, Bruce E., 5,491,376, Cl. 313-495.000.

Gnagi, Christophe: *See—*
Despland, Claude; Gnagi, Christophe; and Podavini, Giacomo, 5,490,996, Cl. 426-548.000.

Godbey, Alice P.: *See—*
Handley, Levis W., III; and Godbey, Alice P., 5,491,090, Cl. 435-240.460.

Goel, Anil B.: *See—*
Warmerdam, Theo W.; Nolten, Henk G.; Day, Edward W., Hetzer, Joseph S.; and Goel, Anil B., 5,490,876, Cl. 106-213.000.

Goetschel, Christian J.; Greene, Robert A.; Kertis, Robert A.; Philpott, Rick A.; Richetta, Raymond A.; Schmerbeck, Timothy J.; Schulte, Donald J.; and Swart, David P., to International Business Machines Corporation. Method and apparatus for generating a clock signal from a continuous oscillator signal including a translator circuit. 5,491,441, Cl. 327-291.000.

Goetschel, Christian J.; Greene, Robert A.; Kertis, Robert A.; Philpott, Rick A.; Richetta, Raymond A.; Schmerbeck, Timothy J.; Schulte, Donald J.; and Swart, David P., to International Business Machines Corporation. Operational transconductance amplifier with independent transconductance and common mode feedback control. 5,491,447, Cl. 330-254.000.

Gold, Danny. Open fingered glove structure. 5,490,290, Cl. 2-159.000.

Gold, John N., Jr.: *See—*
Cory, Thornton E.; and Gold, John N., Jr., 5,490,343, Cl. 42-70.080.

Gold, Peter. Utility knife for cutting and scraping. 5,490,331, Cl. 30-143.000.

Gold Star, Ltd.: *See—*
Lee, Min G., 5,490,450, Cl. 99-337.000.

Golden Key Futura, Inc.: *See—*
Troncoso, Vincent F., 5,490,491, Cl. 124-44.500.

Goldsmith, Aaron; and Adams, Craig, to Goldsmith, Rosalyn. Modular high-low-adjustable contour-adjustable bed. 5,490,298, Cl. 5-611.000.

Goldsmith, Amy M.; Goldsmith, David B.; and Pettus, Christopher E., to Taligent, Inc. Object-oriented remote procedure call networking system. 5,491,800, Cl. 395-200.120.

Goldsmith, David B.: *See—*
Goldsmith, Amy M.; Goldsmith, David B.; and Pettus, Christopher E., 5,491,800, Cl. 395-200.120.

Goldsmith, Rosalyn: *See—*
Goldsmith, Aaron; and Adams, Craig, 5,490,298, Cl. 5-611.000.

Goldsmith Seeds Inc.: *See—*
Bowman, Robert N., 5,491,285, Cl. 800-200.000.

Goldstar Co., Ltd.: *See—*
Hong, Seong H., 5,491,522, Cl. 348-663.000.
Lee, Eun Y.; and Bae, Hyoung K., 5,491,378, Cl. 313-506.000.
Oh, Tae K.; Choi, Kyu N.; and Hur, Chang W., 5,491,566, Cl. 358-472.000.

Goldstein, Avery N., to Starfire Electronic Development & Marketing, Ltd. Method of making large-area semiconductor thin films formed at low temperature using nanocrystal presursors. 5,491,114, Cl. 437-233.000.

Golesis, Kyriakos. Metal shredding machine. 5,490,637, Cl. 241-194.000.

Golz, Peter; Rinke, Andreas; and Krössmann, Jürgen, to Hauni Maschinenbau AG. Apparatus for transporting mass flows of articles. 5,490,589, Cl. 198-444.000.

Gonzales, Leo: *See—*
Lasko, William E.; Litvin, Charles; Hafeken, Kurt F.; and Gonzales, Leo, 5,490,957, Cl. 261-29.000.

Goodfellow, Dane G.: *See—*
Daughenbaugh, Norman E.; and Goodfellow, Dane G., 5,491,214, Cl. 528-483.000.

Goodwater, Frank J.; Huynh, Lang D.; and Kang, David S., to Chromalloy Gas Turbine Corporation. Gas turbine engine vane assembly repair apparatus. 5,490,322, Cl. 29-722.000.

Goodwin, Jeremy P.: *See—*
Allen, Wade C.; Goodwin, Jeremy P.; Nielsen, Robert L.; Reder, Paul J.; and Toltzman, Douglas, 5,491,822, Cl. 395-700.000.

Goodyear Tire & Rubber Company, The: *See—*
Beers, Roger N.; Benko, David A.; Gross, Bill B.; and Halasa, Adel F., 5,491,196, Cl. 525-237.000.
Massie, Johnny D., II; Hobart, Paul W.; and Malin, Jerry, 5,490,550, Cl. 152-193.000.
Prakash, Amit; Kim, Dong K.; Shemenski, Robert M.; and Lewis, William C., 5,490,551, Cl. 152-556.000.

Gopal, Gita; and Wuu, Sze-Ying, to Bell Communications Research Inc. Linking system and method for accessing directory information about an object in one context when information in another context is known. 5,491,817, Cl. 395-600.000.

Gordon, Robert D.; Sinnott, Joseph F., Jr.; and Walling, Lonnie S., to International Business Machines Corporation. System and method for providing visual display transition effects. 5,491,778, Cl. 395-133.000.

Gordon, Robert L.; and Bernstein, Linda A., to International Paper Company. Glass bottle carrier with divider. 5,490,593, Cl. 206-157.000.

Gorzinski, Manfred: *See—*
Eicken, Ulrich; Mathis, Raymond; Fiedler, Heidi; and Gorzinski, Manfred, 5,490,943, Cl. 252-8.600.

Goto, Jun: *See—*
Sato, Fumie; Amano, Takchiro; Kameo, Kazuya; Tanami, Tohru; Mutoh, Masaru; Ono, Naoya; and Goto, Jun, 5,491,254, Cl. 560-121.000.

Gould, Adam F.; Robertson, James R.; Noneman, John W.; and Gelm, John R., to Nokia Mobile Phones Ltd. CDMA radiotelephone having optimized slotted mode and long code operation. 5,491,718, Cl. 375-205.000.

Gould, Sharon: *See—*
Brust, Thomas B.; Gould, Sharon; Sutton, James E.; and Szajewski, Richard P., 5,491,050, Cl. 430-380.000.

Gove, Robert J., to Texas Instruments Incorporated. System and method for simultaneously viewing a scene and an obscured object. 5,491,510, Cl. 348-77.000.

Gozum, John E.: *See—*
Brown-Wensley, Katherine A.; Palazzotto, Michael C.; Lamanna, William M.; Boardman, Larry D.; Gozum, John E.; and McCormick, Fred B., 5,491,206, Cl. 526-126.000.

GPT Limited: *See—*
Shipley, Simon P., 5,491,573, Cl. 359-110.000.

Graber, David W.: *See—*
Pawlak, Andrzej M.; Lin, William C.; Graber, David W.; Eckhardt, Dennis C.; Weiss, Scott E.; Radamis, Maged; Perry, Thomas A.; and Bradley, John R., 5,491,632, Cl. 364-424.050.

Grabowski, Sven; Kah-Helbig, Astrid; Sanner, Axel; and Wendel, Kurt, to BASF Aktiengesellschaft. Production of solid pharmaceutical depot forms. 5,490,990, Cl. 424-486.000.

Graebe, Christopher M.: *See—*
Earle, Anthony; Graebe, Christopher M.; Glover, Edward C. T. S.; Skye, David A.; Taylor, Nicholas J.; and Ward, Paul C., 5,491,530, Cl. 354-313.000.

Graham, Samuel J.: *See—*
deSolms, S. Jane; and Graham, Samuel J., 5,491,164, Cl. 514-423.000.

Gram, Martin M., to MTS Systems Corporation. Mass oscillator having an adjustable gas spring. 5,491,306, Cl. 181-106.000.

Grammer AG: *See—*
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Osborn, Charles; and Medema, Robert M., 5,490,434, Cl. 74-475.000.

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Distefano, Thomas H.; Kovac, Zlata; and Grange, John, 5,491,302, Cl. 114-260.000.

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Person, Wayne C.; Theroux, Marc J.; Azarbarzin, Kurt; and Granger, Richard N., 5,490,856, Cl. 606-139.000.

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Gray, William R., to Astec Industries, Inc. Control cab support mechanism. 5,490,635, Cl. 241-101.760.

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Mirov, Russell N.; Le, Duc N.; Mikalauskas, Frank; Grebenkemper, C. John; and Kwan, Kinying, 5,491,442, Cl. 327-295.000.

Greco, Michael N.: *See—*
Janssen, Marcel A. C.; Raeymaekers, Alfons H. M.; Freyne, Eddy J. E.; and Greco, Michael N., 5,491,161, Cl. 514-394.000.

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Nishimura, Ken-ichi; Yoshimi, Akihisa; Mori, Takayoshi; Kakeya, Nobuharu; Kikuchi, Masahiro; Kondoh, Nobuo; Uchida, Takeshi; and Yamanouchi, Koichi, 5,491,171, Cl. 514-558.000.

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Swedo, Raymond J.; Green, George D.; and Snyder, James R., 5,491,178, Cl. 522-74.000.

Green, Jeffrey W.: *See—*
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Robert, Edgar J.; Howie, F. James, III; Nagel, Christopher J.; and Griffin, Thomas P., 5,491,279, Cl. 588-201.000.

Griggs, James R.: *See*—
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Gueret, Jean-Louis H., to L'Oreal. Wiping device for a fluid product applicator assembly. 5,490,737, Cl. 401-122.000.

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Williams, Stephen G.; Guess, Ronald W.; and Cook, Lori A., 5,490,395, Cl. 62-187.000.

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Gundy, William P. Anchoring device for a threaded member. 5,490,750, Cl. 411-55.000.

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Roberts, David D.; Krutzsch, Henry C.; Sipes, John M.; Guo, Neng-hua; and Negre, Eric, 5,491,130, Cl. 514-13.000.

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Guth, Christian, to Ciba-Geigy Corporation. Process for washing off prints or dyeings on cellulosic textile materials. 5,490,866, Cl. 8-549.000.

Guy, Monroe W. Method for treating wastewater. 5,490,935, Cl. 210-620.000.

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Hagen, Helmut; Nilz, Gerhard; Roetsch, Thomas; Walter, Helmut; and Landes, Andreas, to BASF Aktiengesellschaft. Herbicides containing 3-aminobenzo(B)thiophenes as antidotes. 5,491,123, Cl. 504-104.000.

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Hahnen, Kevin F.: *See*—
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Hakala, Harri: *See*—
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Hakamatsuka, Yasuharu: *See*—
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Hake, Lisa E.: *See*—
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Beers, Roger N.; Benko, David A.; Gross, Bill B.; and Halasa, Adel F., 5,491,196, Cl. 525-237.000.

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Haley, Neil F.: *See*—
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Hall, Charles B.: *See*—
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Hall, James E.: *See*—
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Hall, Scott M., to Motorola, Inc. Method for controlling transmission during handoff in a communication system. 5,491,717, Cl. 375-205.000.
Hall, Stephen H., to Battelle Memorial Institute. Capillary reference half-cell. 5,490,916, Cl. 205-775.000.
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Wesson, David; George, Kevin R.; and George, Flint R., 5,490,563, Cl. 166-297.000.
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Hamabe, Kojiro, to NEC Corporation. Mobile radio communication system having radio zones of sector configurations and antenna selecting method employed therein. 5,491,833, Cl. 455-33.100.
Hamada, Akihiko; Koizumi, Yoshimasa; Hiraoka, Hidenori; and Yabuki, Yoshikazu, to Sumitomo Rubber Industries, Ltd. Three-piece solid golf ball. 5,490,674, Cl. 273-228.000.
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Urakami, Tsuneyuki; and Tsuchiya, Yutaka, 5,491,329, Cl. 250-205.000.
Hamilton, John F.; and Leone, Anthony J., to Eastman Kodak Company. Method and associated apparatus for writing a halftone dot having a variable density edge profile. 5,491,558, Cl. 358-298.000.
Hammeken, Michael, to W.R. Grace & Co.-Conn. Spiral-wound filtration cartridge with longitudinal bypass feature. 5,490,926, Cl. 210-321.740.
Hammershaimb, Harold U.: *See*—
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Hamzehdoost, Ahmad; and Mora, Leonard L., to VLSI Technology, Inc. Package structure having accessible chip. 5,491,362, Cl. 257-712.000.
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Handley, Levis W., III; and Godbey, Alice P., to Westvaco Corporation. Embryogenic coniferous liquid suspension cultures. 5,491,090, Cl. 435-240.460.
Haner, Lambert. Repulsion motor. 5,491,398, Cl. 318-725.000.
Haniff, Marlon; Falk, Robert; Deisenroth, Ted; and Mueller, Karl F., to Ciba-Geigy Corporation. Poly-perfluoroalkyi-substituted alcohols and acids, and derivatives thereof. 5,491,261, Cl. 562-582.000.
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Hansen, Christopher L.; and Park, Stuart L., to Kinetico Incorporated. Fluid treatment valve system with nozzle driven turbine. 5,490,932, Cl. 210-541.000.
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Benjamin, Thomas L.; Chen-Wu, Joan; Hansen, Thomsen; Jackson, Barbara; Livingston, David; Tannenbaum, Steven; and Wogan, Gerald, 5,491,068, Cl. 435-7.320.
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Hardt, Thomas T.: *See*—
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Harmon, John P.: *See*—
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Harper, John A.: *See*—
Gunner, Christopher W.; Harper, John A.; and Shand, Ian M. C., 5,491,692, Cl. 370-85.130.
Harper, Myron E.; Robson, Sharon L.; and Combs, Connie W., to Bell Atlantic Network Services, Inc. Method and apparatus for provisioning a public switched telephone network. 5,491,742, Cl. 379-201.000.
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Hartfel, Margaret A.: *See*—
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Harvey, Bruce A.: *See*—
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Hasegawa, Takayoshi: *See*—
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Hayashi, Masaki: *See*—
Akizuki, Kenichiro; Suenaga, Hiroharu; and Hayashi, Masaki, 5,490,718, Cl. 297-452.490.
Hayden, Joseph S.: *See*—
Malone, Kevin J.; Hayden, Joseph S.; Sanford, Norman A.; and Aust, John A., 5,491,708, Cl. 372-41.000.
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Pihl, Richard M.; Hayes, Duane J.; Barber, Loren L., Jr.; Welygan, Dennis G.; Hardwick, R. Eugene; Zemke, Ronald O., deceased, 5,491,025, Cl. 428-373.000.
Hayes Wheels International, Inc.: *See*—
Archibald, Kenneth R., 5,490,720, Cl. 301-35.620.
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Fowler, Daniel L.; and Hayes, William S., 5,491,614, Cl. 361-784.000.
Haymond, David L. Meter reading apparatus. 5,491,589, Cl. 359-895.000.
Haynes, Henry T. Venting device and method. 5,490,632, Cl. 239-119.000.
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Heath, Chester A.; Langgood, John K.; and Valli, Ronald E., to International Business Machines Corp. Method and apparatus for automatic initialization of pluggable option cards. 5,491,804, Cl. 395-275.000.
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Hebert, Paul W.; Floyd, Ted; Rogers, Larry C.; and Howe, Dorothy L. Hammer. 5,490,437, Cl. 81-22.000.
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Floyd, Ted; and Hebert, Paul W., 5,490,306, Cl. 16-250.000.
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Baillargeon, David J.; Cardis, Angeline B.; and Heck, Dale B., 5,490,863, Cl. 44-331.000.
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Manker, Denise C.; Rosendahl, Connie N.; Heide, Morten; Bachmann, Torben L.; and Nielsen, Ruby I., 5,491,122, Cl. 504-100.000.
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Albert, Kevin F., 5,490,666, Cl. 270-5.000.
Hoff, Howard W., 5,490,459, Cl. 101-423.000.
Heidelberger Druchemaschiner AG: *See*—
Albert, Kevin F., 5,490,666, Cl. 270-5.000.
Heidelberger Druckmaschinen AG: *See*—
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Veitch, Ronald J.; Jakusch, Helmut; and Heilmann, Peter, 5,490,476, Cl. 116-217.000.
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Foeldi, Tamás; Stehle, Heinz; Heim, Udo; Xuan, Hai T.; and Wuest, Rainer, 5,491,635, Cl. 364-431.100.
Heimbuch, Brian: *See*—
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Heiniger, Jerry D.: *See*—
Maxson, William R.; Heiniger, Jerry D.; and Rustman, James C., 5,491,407, Cl. 324-174.000.
Heinonen, Erkki; and Hyvönen, Markku, to Instrumentarium Corp. Regulation of a propellant gas flow. 5,490,499, Cl. 128-203.280.
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Heissat, Jean-Marc; and Lacour, Jean-Marc, to Telemecanique. Device for controlling the transfer of a load suspended by cables from a carriage movable in translation in a lifting machine. 5,490,601, Cl. 212-275.000.
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Groffen, John; Heisterkamp, Nora; and Pattengale, Paul K., 5,491,283, Cl. 800-2.000.
Held, Kurt. In-line applications of facing foils to particle boards. 5,490,900, Cl. 156-555.000.
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Helms, David R.; and Fithian, Michael J., to Martin Marietta Corporation. Low power consumption process-insensitive feedback amplifier. 5,491,450, Cl. 330-277.000.
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Henderson, Robert W.: *See*—
Conti, Walter; Feemster, William R.; Felts, Jeffrey L.; Fields, Antony J.; Henderson, Robert W.; Howard, Paul L.; Kaub, Kevin F.; Lederman, Joel A.; Lee, Thomas M.; Martinez, Gilbert; Mathews, Mark H.; Patel, Ravi V.; Waldrep, Michael W.; and Wetzel, John H., 5,490,455, Cl. 100-50.000.
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Mudge, Elbert H.; and Brabson, Thomas D., 5,491,004, Cl. 427-393.400.
Mudge, Elbert H.; and DeWitt, Charles G., 5,491,026, Cl. 428-395.000.
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Eicken, Ulrich; Mathis, Raymond; Fiedler, Heidi; and Gorzinski, Manfred, 5,490,943, Cl. 252-8.600.
Scheer, Hans; Beiersdorf, Wolf-Dieter; and Purps, Hans-Joachim, 5,491,189, Cl. 524-259.000.
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Henton, David E.; Chen, Augustin; Moses, Paul J.; Ehrlich, Benjamin S.; and Beyer, Douglas E., to Dow Chemical Company, The. Thermally processable blends of high modulus polyurethanes and mass polymerized ABS resins. 5,491,194, Cl. 525-66.000.
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Hepler, Jacque. Apparatus and method for attaching plastic siding or trim pieces to metal sheathing. 5,490,359, Cl. 52-506.060.
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Weller, Albrecht; Driesen, Georges; Peter, Andreas; Herber, Peter; Schäfer, Gerhard; Schamberg, Stefan; and Birk, Andreas, 5,490,448, Cl. 99-305.000.
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Daughenbaugh, Norman E.; and Goodfellow, Dane G., 5,491,214, Cl. 528-483.000.

Kostas, John N., 5,491,249, Cl. 556-460.000.
Herczeg, Attila E., to Filtron Technology Corporation. Filtration apparatus with membrane filter unit. 5,490,927, Cl. 210-321.840.
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Herkes, Frank E.; and Kourtakis, Kostantinos, to Du Pont de Nemours, E. I., and Company. Preparation of isophorone diamine. 5,491,264, Cl. 558-431.000.
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Hernandez, Orlando: *See*—
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Herriman, William P. Adjustable mounting apparatus for a telescope. 5,490,654, Cl. 248-316.100.
Herrmann, Frederick P.; and Sodini, Charles G., to Massachusetts Institute of Technology. Response resolver for associative memories and parallel processors. 5,491,803, Cl. 395-287.000.
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Hertzler, Carol S.: *See*—
Kim, Yeong-U; Zaremski, Donald R.; and Hertzler, Carol S., 5,490,908, Cl. 148-241.000.
Hessel, Lasse, to Chartex International plc. Tubular protective device for protection against transfer of infectious matter during sexual intercourse. 5,490,519, Cl. 128-842.000.
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Hesterman, Victor W.; and Bhattacharyya, Manoj K. Planar magnetoresistive head with an improved gap structure. 5,491,606, Cl. 360-113.000.
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Warmerdam, Theo W.; Nolten, Henk G.; Day, Edward W.; Hetzer, Joseph S.; and Goel, Anil B., 5,490,876, Cl. 106-213.000.
Hewko, Barry J., to Vancouver Island Helicopters Ltd. Patient transport system. 5,490,703, Cl. 296-19.000.
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Beatty, Christopher C., 5,490,628, Cl. 228-124.600.
Christiansen, Frank J., 5,490,965, Cl. 264-237.000.
Gasperina, Marco D., 5,491,781, Cl. 395-157.000.
Hirst, B. Mark, 5,491,540, Cl. 355-200.000.
Robson, Christopher J.; and May, Gregory J., 5,491,785, Cl. 395-162.000.
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Swanson, David W.; Carlin, Timothy J.; Kaplinsky, George T.; and Harmon, John P., 5,491,502, Cl. 347-87.000.
Thompson, Michael I.; Congdon, Paul T.; Burnett, John L.; Fiduccia, Frank, deceased, 5,491,802, Cl. 395-200.180.
Ueno, Toshiaki; and Kondoh, You, 5,491,427, Cl. 324-754.000.
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Higgins, William B.: *See*—
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Highland Supply Corporation: *See*—
Weder, Donald E.; and Straeter, William F., 5,490,352, Cl. 47-58.000.
Highwood, David P.: *See*—
Knight, Robert J.; and Highwood, David P., 5,491,160, Cl. 514-384.000.
Hildwein, Roger L.; Uschold, Robert C.; Staley, J. D., Jr.; Riestenberg, Paul; Gallagher, Laura; and Nagao, Rex, to Ethicon, Inc. Flexible endoscopic surgical port. 5,490,843, Cl. 604-164.000.
Hill, David A. Prosthesis air valve assembly and tool therefor. 5,490,537, Cl. 137-315.000.
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Hinton, Michael P.: *See*—
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Hioki, Takanori, to Fuji Photo Film Co., Ltd. Silver halide emulsion. 5,491,057, Cl. 430-584.000.
Hirakawa, Hiroyuki, to Murata Kikai Kabushiki Kaisha. Motor drive device using one-two phase excitation. 5,491,397, Cl. 318-696.000.
Hiraoka, Hidenori, to Sumitomo Rubber Industries, Ltd. Golf ball. 5,490,673, Cl. 273-220.000.
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Hirata, Kazuo: *See*—
Ishiizumi, Seiichi; Nakata, Yasuo; Hirata, Kazuo; and Nakashima, Akinori, 5,490,574, Cl. 180-68.100.
Hirata, Sumiaki; Maekawa, Kazunobu; and Nagata, Kenzo, to Minolta Camera Kabushiki Kaisha. Control appartus of copying machine with improved communication function for centralized control. 5,491,535, Cl. 355-204.000.
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Hirose, Toshihiko; Ohbayashi, Shigeki; Kondo, Setsu; Hayasaka, Takashi; Fujino, Yoshiyuki; and Iketani, Masayuki, to Mitsubishi Denki Kabushiki Kaisha. Semiconductor memory device having non-selecting level generation circuitry for providing a low potential during reading mode and high level potential during another operation mode. 5,491,655, Cl. 365-177.000.
Hirose, Yasuo: *See*—
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Hiroshima, Minoru: *See*—
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Hirsch, Thomas S.: *See*—
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Hirst, B. Mark, to Hewlett-Packard Company. Replacement part with integral memory for usage and calibration data. 5,491,540, Cl. 355-200.000.
Hirst, Donald J.: *See*—
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Akita, Hideki; Ota, Makoto; Nakatani, Hideaki; Hatano, Kazuyoshi; and Ogasawara, Manabu, 5,490,730, Cl. 384-147.000.
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Umezawa, Koichi; Kuriyama, Hiroyuki; Nishiyama, Takanori; Ishida, Kiyoshi; and Ishinabe, Iwao, 5,491,507, Cl. 348-14.000.
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Ho, Jackson H.: *See*—
Allen, Robert R., deceased; Bruce, Richard H.; Chuang, Tzu-Chin; Fiske, Thomas G.; Fulks, Ronald T.; Hack, Michael; Ho, Jackson H.; Lewis, Alan G.; Martin, Russel A.; Silverstein, Louis D.; Steemers, Hugo L.; Stuber, Susan M.; Thompson, Malcolm J.; Turner, William D.; and Yao, William W., 5,491,347, Cl. 257-59.000.
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Hobbs, Charles C.: *See*—
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Hobert, Marcus V. Craps layout arrangement with jackpot wagering area and randomized jackpot sequences. 5,490,670, Cl. 273-138.00A.
Hocquellet, Dominique; and Chenier, Jean P., to Aerospatiale Societe Nationale Industrielle. Process for the production of a carbon/carbon composite material part using mesophase powder. 5,491,000, Cl. 427-113.000.
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Huber, Bernd; and Neuert, Richard, 5,490,308, Cl. 19-239.000.
Leupold, Ernst I.; Kaufmann, Wolf-Dietmar; Laugwitz, Bernd; Duchatsch, Günther; and Meyer-Blumenroth, Ulrich, 5,490,936, Cl. 210-636.000.
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Brodof, Terry A.; and Hopkins, John B., Jr., 5,491,024, Cl. 438-1372.000.
Chung, Tai-Shung; Kafchinski, Edward R.; and Haubs, Michael, 5,490,931, Cl. 210-500.230.

Hoel, Elvin L., to Exxon Chemical Patents Inc. Process of producing high molecular weight ethylene-α-olefin elastomers with an indenyl metallocene catalyst system. 5,491,207, Cl. 526-129.000.

Hoeptner, Wolfgang: *See—*
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Hoerner, Josef: *See—*
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Hoff, Howard W., to Heidelberger Druckmaschinen AG; and Heidelberg Harris, Inc. Printing press and method for removing ink build-up with sideways web movement. 5,490,459, Cl. 101-423.000.

Hoffbeck, Loren J.: *See—*
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Hoffman, Jay. Magnetic damping system to limit blade tip vibrations in turbomachines. 5,490,759, Cl. 415-10.000.

Hoffmann, James A.; and Lambooy, Peter K., to Eli Lilly and Company. Tri-arginine insulins. 5,491,216, Cl. 530-303.000.

Hoffmann-La Roche Inc.: *See—*
Fisher, Mary E.; and Watson, Robert M., 5,491,063, Cl. 435-6.000.
Gelfand, David H.; and Wang, Alice M., 5,491,086, Cl. 435-194.000.
Picone, Teresa K. H.; McCallum, Theresa M.; and Zoccoli, Michael A., 5,491,225, Cl. 536-24.320.

Hofmann, Henrich; Langer, Roland; and Hassiotis, Vasilis, to FAG Kugelfischer Georg Schafer AG. Wheel bearing hub with deformed bead. 5,490,732, Cl. 384-537.000.

Hogan, Paul. Testing device for surfaces subject to impact. 5,490,411, Cl. 73-12.130.

Hogg, Neil; and Straub, Joseph, to BOC Group, Inc., The. Method and apparatus for producing oxygen. 5,490,391, Cl. 62-38.000.

Hohmann, Friedrich; Röll, Werner; and Mörtel, Hans G., to Metallgesellschaft Aktiengesellschaft. Tubular heater for preparing carbon monoxide-containing gas mixtures. 5,490,974, Cl. 422-197.000.

Hojun Kogyo Co., Ltd.: *See—*
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Holden's Foundation Seeds Inc.: *See—*
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Holley, Leonard, to Rexam Industries Corp. Static-dissipating adhesive tape. 5,491,013, Cl. 428-40.000.

Hollister Inc.: *See—*
Vrona, David W.; Lavender, Michael R.; Peterson, James J.; and Love, Margo E., 5,490,504, Cl. 128-207.170.

Hollister, William H., to Smiths Industries Medical Systems, Inc. Suction catheter having multiple valves and collet assembly. 5,490,503, Cl. 128-205.120.

Holloman, Roland: *See—*
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Hollstein, Elmer J.: *See—*
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Holmes, Timothy B.; and Scsavnicki, Paul M., to Picker International, Inc. Magnetic resonance scanner with improved packaging for circuitry within the magnetic field. 5,491,415, Cl. 324-322.000.

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Nasu, Rikuo; Hamaguchi, Motohiko; and Ariyoshi, Hayato, 5,491,239, Cl. 546-345.000.
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Umezawa, Koichi; Kuriyama, Hiroyuki; Nishiyama, Takanori; Ishida, Kiyoshi; and Ishinabe, Iwao, 5,491,507, Cl. 348-14.000.
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Hulse, David J.; and Heinemann, John G., 5,490,472, Cl. 114-90.000.
Itakura, Keijirou; Nobusada, Toshihide; Toyoda, Yasuyuki; Saitoh, Yukio; Kokusenya, Noboru; Nagayoshi, Ryouichi; Tanaka, Hironori; and Ozaki, Masayoshi, to Matsushita Electronics Corporation. Solid state image sensor device and its driving method. 5,491,512, Cl. 348-321.000.
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Kostopolos, Peter; and Facco, Giuseppe, 5,490,315, Cl. 29-527.700.
Ito, Hideo: *See*—
Sugawara, Kazuaki; and Ito, Hideo, 5,491,560, Cl. 358-342.000.
Ito, Shuji: *See*—
Hasegawa, Masaki; Bito, Yasuhiko; Ito, Shuji; Murai, Hiroyuki; and Toyoguchi, Yoshinori, 5,490,320, Cl. 29-623.100.
Ito, Takao: *See*—
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Ito, Yasuo: *See*—
Miyata, Shigeru; Yamada, Yoshitaka; Yoshida, Hideji; Matsubara, Yoshihiro; and Ito, Yasuo, 5,491,417, Cl. 324-402.000.
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ITT Corporation: *See*—
Iorio, Ralph A.; and Gibbs, Glen A., 5,490,542, Cl. 138-140.000.
Johnson, Robert E.; Charlton, Gregory G.; Sterns, William G.; and Cho, Ching-Fai, 5,491,489, Cl. 343-779.000.
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Iwaguchi, Isao: *See*—
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Iwasa, Seiichi: *See*—
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Iwasaki, Yasuo, to Mitsubishi Denki Kabushiki Kaisha. Cathode, electron gun, and cathode-ray tube having a heating element for use during cold electron emisson. 5,491,375, Cl. 313-409.000.
Iwase, Hiroshi: *See*—
Maro, Hideharu; Kodaira, Hideki; Iwase, Hiroshi; and Komiya, Yuji, 5,491,018, Cl. 428-200.000.
Iwata, Minoru: *See*—
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Iwata, Yasutaka: *See*—
Kataoka, Yoshiyuki; Murase, Michio; Araki, Hidefumi; and Iwata, Yasutaka, 5,491,730, Cl. 376-283.000.
Iwatani, Shirou; and Kouwa, Tatsuki, to Mitsubishi Denki Kabushiki Kaisha. Control device for a vehicular ac generator. 5,491,400, Cl. 322-28.000.
Jaaskelainen, William: *See*—
Freeman, Harrison L.; Jaaskelainen, William; Mustain, Richard G.; and Shumway, Larry D., 5,491,807, Cl. 395-401.000.
Jachimowicz, Karen E.: *See*—
Lebby, Michael S.; and Jachimowicz, Karen E., 5,491,491, Cl. 345-7.000.
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Benjamin, Thomas L.; Chen-Wu, Joan; Hansen, Thomsen; Jackson, Barbara; Livingston, David; Tannenbaum, Steven; and Wogan, Gerald, 5,491,068, Cl. 435-7.320.
Jackson, Michael M.: *See*—
Cranney, Don H.; Lawrence, Lawrence D.; and Jackson, Michael M., 5,490,887, Cl. 149-2.000.
Jackson, Ronald W.: *See*—
Jones, David E.; Gewin, Robert E.; and Jackson, Ronald W., 5,491,722, Cl. 375-224.000.
Jacobson, Chester F.: *See*—
Chylinski, Henryk J.; Jacobson, Chester F.; Salisbury, Timothy M.; and Borden, Frederick R., 5,490,329, Cl. 30-49.000.
Jadhav, Prabhakar K., to Du Pont Merck Pharmaceutical Company, The. Dihydroxypropylamine containing retroviral protease inhibitors. 5,491,149, Cl. 514-307.000.
Jadhav, Prabhakar K.: *See*—
Arentzen, Rene; Jadhav, Prabhakar K.; Kobos, Robert K.; and Smart, Bruce E., 5,491,083, Cl. 435-181.000.
Jain, Mahendra K.; Narayan, Ramani; and Han, Ohantaek, to Michigan Biotechnology Institute. Biological method for coal comminution. 5,490,634, Cl. 241-1.000.
Jain, Rajendra K.; Ramakrishnan, K. K.; and Chiu, Dah-Ming, to Digital Equipment Corporation. System for avoiding network congestion by distributing router resources equally among users and forwarding a flag to those users utilize more than their fair share. 5,491,801, Cl. 395-200.130.
Jain, Rakesh; Schleigh, William R.; and Stewart, Robert C., to Eastman Kodak Company. Photographic elements containing 2-equivalent pyrazolone magenta dye forming couplers and stabilizing compounds. 5,491,054, Cl. 430-551.000.
Jakusch, Helmut: *See*—
Veitch, Ronald J.; Jakusch, Helmut; and Heilmann, Peter, 5,490,476, Cl. 116-217.000.
Jamar Technologies Co.: *See*—
Rieger, Harry; Shields, Henry; and Foster, Richard M., 5,491,707, Cl. 372-25.000.
Jamart-Gregoire, Brigitte: *See*—
Caubere, Paul; Jamart-Gregoire, Brigitte; Caubere, Catherine; Bizot-Espiard, Jean-Guy; Renard, Pierre; and Adam, Gérard, 5,491,163, Cl. 514-411.000.
James, Bryan D.: *See*—
Adamczyk, Maciej; Chen, Yon-Yih; Walling, John A.; James, Bryan D.; and Artrip, Sharon G., 5,491,071, Cl. 435-25.000.
James River Corporation of Virginia: *See*—
Schulz, Galyn A., 5,490,902, Cl. 162-109.000.
James, Robert O.: *See*—
DeCory, John F.; James, Robert O.; Tingler, Kenneth L.; and Wexler, Ronald M., 5,491,051, Cl. 430-496.000.
Jan, Yung-Jung; and Jang, Yi-Feng, to Industrial Technology Research Institute. Variable length decoder using serial and parallel processing. 5,491,480, Cl. 341-67.000.
Jan, Yves: *See*—

Tremel, Jean-Yves; Garandel, René; and Jan, Yves, 5,491,697, Cl. 371-5.100.

Janes, Clarence W., to California Energy Commission. Performance enhanced gas turbine powerplants. 5,490,377, Cl. 60-39.120.

Jang, Yi-Feng: *See*—
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Janik, Craig M., to Key, Idea Development. Flexible wearable computer. 5,491,651, Cl. 364-708.100.

Jankevics, Andrew J.: *See*—
Wormell, Dean C.; Huettig, Fred R.; Jankevics, Andrew J.; Winter, Michael; and Sopchak, James L., 5,491,642, Cl. 364-509.000.

Jano, Patrice; and Rat, Sylvie, to Thomson-CSF. Optical device for the unambiguous measurement of the roll angle of a projectile. 5,490,643, Cl. 244-3.110.

Jansen, Marinus J., to Fluke Corporation. Voltage multiplier using switched capacitance technique. 5,491,623, Cl. 363-60.000.

Jansma, Roger H.; Begala, A. James; and Furman, Gary S., to Nalco Chemical Company. Strength resins for paper. 5,490,904, Cl. 162-168.200.

Janssen, Marcel A. C.; Raeymaekers, Alfons H. M.; Freyne, Eddy J. E.; and Greco, Michael N., to Janssen Pharmaceutica N.V. Pyrroloimidazolyl and imidazopyridinyl substituted 1H-benzimidazole derivatives. 5,491,161, Cl. 514-394.000.

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Janssen, Marcel A. C.; Raeymaekers, Alfons H. M.; Freyne, Eddy J. E.; and Greco, Michael N., 5,491,161, Cl. 514-394.000.
Noppe, Marcus J. M.; and Konings, Frank J., 5,491,098, Cl. 436-525.000.

Jantschek, Robert J.; Rouser, Forrest J.; Sterner, Mark L.; and Testen, Theodore J., to Minnesota Mining and Manufacturing Company. Abrasive attachment system for rotative abrading applications. 5,490,808, Cl. 451-59.000.

Janusauskas, Albert. Electroluminescent lamp and method. 5,491,377, Cl. 313-506.000.

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Irikura, Takayuki; and Kakiuchi, Makoto, 5,490,527, Cl. 131-280.000.

Jaramillo, Joseph E.: *See*—
Huppenthal, Jon M.; Saunders, Candy L.; and Jaramillo, Joseph E., 5,491,300, Cl. 174-151.000.

Jarolics, Gyula, to FLS Automation A/S. Apparatus for sampling gas from a hot dust-filled gas stream. 5,490,429, Cl. 73-863.830.

Jasper, Louis J., Jr.: *See*—
Kim, Anderson H.; Youmans, Robert J.; Saddow, Stephen E.; Jasper, Louis J., Jr.; and Weiner, Maurice, 5,491,490, Cl. 343-895.000.

Jaunakais, Ivars: *See*—
Ramana, Vasili V.; Yamuna, Kami R.; and Jaunakais, Ivars, 5,491,094, Cl. 436-125.000.

Jay Medical Ltd.: *See*—
Dinsmoor, John C., III; and VanEveren, Barry, 5,490,299, Cl. 5-654.000.

Jeffries, Andrew; Green, Michael L.; and Noakes, Timothy J., to Imperial Chemical Industries PLC. Apparatus for ligament made electrostatic spraying. 5,490,633, Cl. 239-691.000.

Jen, Wang H. Acoustic board. 5,491,310, Cl. 181-286.000.

Jenkins, Anthony; and McGann, William J., to Ion Track Instruments, Inc. Ion trap mobility spectrometer and method of operation for enhanced detection of narcotics. 5,491,337, Cl. 250-287.000.

Jeong, Jechang; and Ahn, Wooyoun, to Samsung Electronics Co., Ltd. Forced intra-frame coding method. 5,491,509, Cl. 348-402.000.

Jespersen, Carsten: *See*—
Danielsen, Frede; and Jespersen, Carsten, 5,490,813, Cl. 454-306.000.

Jessen, Robert F.: *See*—
Drittmyer, James F.; Jessen, Robert F.; and Melnyk, George, 5,490,638, Cl. 242-421.000.

Jet Spray Corp.: *See*—
Sardynski, Gary F., 5,490,614, Cl. 222-129.100.

Jiang, Jinghua J.: *See*—
Lim, Chun B.; Kline, Barry D.; Jiang, Jinghua J.; and Rappoport, Vitaliy, 5,491,342, Cl. 250-363.090.

Jiang, Zhiping: *See*—
Abraham, Kuzhikalail M.; Alamgir, Mohamed; and Jiang, Zhiping, 5,491,041, Cl. 429-212.000.

Jirousek, Michael R.: *See*—
Gillig, James R.; and Jirousek, Michael R., 5,491,242, Cl. 548-455.000.

Jochim, Dorothy M.: *See*—
Jochim, Roland F.; and Jochim, Dorothy M., 5,490,617, Cl. 223-61.000.

Jochim, Roland F.; and Jochim, Dorothy M. Abdominal binder stretcher. 5,490,617, Cl. 223-61.000.

John Crane Inc.: *See*—
Borrino, Thomas; and Kraft, Mark E., 5,490,679, Cl. 277-65.000.
Radosav, Jon J.; Dudek, David M.; Browar, Orest T.; and Ralle, Angelo G., 5,490,682, Cl. 277-815.000.

Johnson & Johnson Clinical Diagnostics, Inc.: *See*—
Hartman, Gary S.; and Miller, James G., 5,490,972, Cl. 422-64.000.

Johnson & Johnson Inc.: *See*—
Boulanger, Roger; Metta, Flavio; and Contant, Réal, 5,490,457, Cl. 101-170.000.

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Nuñez, Ivan M.; Molock, Frank F.; Elliott, Laura D.; and Ford, James D., 5,490,960, Cl. 264-2.600.
Nuñez, Ivan M.; Molock, Frank F.; Elliott, Laura D.; and Ford, James D., 5,490,959, Cl. 264-2.600.

Johnson, Charles L.; Miller, Allan A.; Snow, Herbert P.; and Miller, Vernon A., to Ahead, Inc. Music instrument which generates a rhythm EKG. 5,491,297, Cl. 84-609.000.

Johnson, Constance A.; and McVeigh, Harold L., to Whimsical Walls, Inc. Releasably mountable wall ornament. 5,491,006, Cl. 428-13.000.

Johnson, Daniel N.: *See*—
Lamberty, Bruce R.; Callahan, Shawn F.; and Johnson, Daniel N., 5,490,463, Cl. 102-439.000.

Johnson, Edwin F.; Lockie, Douglas G.; and Mohwinkel, Clifford A., to Endgate Technology Corporation. Dual-sided push-pull amplifier. 5,491,449, Cl. 330-269.000.

Johnson, Gregg E.: *See*—
Soble, Richard M.; Owens, Timothy E.; and Johnson, Gregg E., 5,490,460, Cl. 101-424.000.

Johnson, Mark A.: *See*—
Pokora, Alexander R.; and Johnson, Mark A., 5,491,085, Cl. 435-192.000.

Johnson, Randy A.: *See*—
Sokoloff, Michael D.; and Johnson, Randy A., 5,490,545, Cl. 141-319.000.

Johnson, Robert E.; Charlton, Gregory G.; Sterns, William G.; and Cho, Ching-Fai, to ITT Corporation. ASR system for microburst detection. 5,491,489, Cl. 343-779.000.

Johnson, Robert J. Ground stabilized transportable drop hammer. 5,490,740, Cl. 299-37.400.

Johnson, R. Patrick: *See*—
Belove, Edward; Culbert, James A.; Johnson, R. Patrick; Heath, David M.; Kraley, Michael F.; Méndez, Deborah; Pant, Sangam; and Zagieboylo, Stephen, 5,491,820, Cl. 395-600.000.

Johnson, Timothy L.: *See*—
Isaacson, Philip O.; Gadtke, David W.; and Johnson, Timothy L., 5,490,523, Cl. 128-633.000.

Johnston, Chris. Golf swing practice/training device. 5,490,672, Cl. 273-187.200.

Johnston, J. O'Neal: *See*—
Peet, Norton P.; Johnston, J. O'Neal; and Burkhart, Joseph P., 5,491,136, Cl. 514-172.000.

Jokinen, Harri: *See*—
Malkamaki, Esa; and Jokinen, Harri, 5,491,832, Cl. 455-33.100.

Jones, David E.; Gewin, Robert E.; and Jackson, Ronald W., to Communications Technology Corporation. Eye pattern margin measurement and receiver stress detection device. 5,491,722, Cl. 375-224.000.

Jones, Mark F.; and Devilliers, Henry, to Laser Stealth Technology L.L.C. Method and apparatus for inhibiting laser detection. 5,491,547, Cl. 356-28.000.

Jones, Oliver D.; and Stephens, Donald E., to Oliver Design, Inc. System and method for texturing magnetic data storage disks. 5,490,809, Cl. 451-60.000.

Jones, Ralph W.; Wideman, Catherine C.; and Twombly, Paul W., to Eastman Kodak Company. Film for duplicating silver images in radiographic films. 5,491,058, Cl. 430-596.000.

Joó, Gábor; and Tóth, László. Cellulose-based package material having an increased adsorption capacity and process for the manufacture thereof. 5,491,008, Cl. 428-34.200.

Joshi, Mahendra L.; and Broadway, Lee, to Combustion Tec, Inc. Forward injection oxy-fuel burner. 5,490,775, Cl. 431-187.000.

Jot, Jean-Marc; and Chaigne, Antoine, to France Telecom. Method and system for artificial spatialisation of digital audio signals. 5,491,754, Cl. 381-63.000.

Joyeux, Christophe: *See*—
van der Hoeven, Frans A.; and Joyeux, Christophe, 5,490,954, Cl. 252-550.000.

JSF Consulants Ltd.: *See*—
Freed, Jeffrey S., 5,490,984, Cl. 424-436.000.

Jung, Chu W.: *See*—
Enriquez, Philip; Jung, Chu W.; and Groman, Ernest V., 5,490,991, Cl. 424-488.000.

Junghans, Andreas: *See*—
Lohmann, Bernd; and Junghans, Andreas, 5,491,012, Cl. 428-40.000.

Junod, Gilbert; and Warnke, Pierre, to Valeo. Cover plate for a diaphragm clutch, especially for a motor vehicle. 5,490,586, Cl. 192-89.230.

Jupa, Joseph M.: *See*—
Rieck, James N.; and Jupa, Joseph M., 5,491,211, Cl. 528-60.000.

Jurgenson, Ryan: *See*—
Bennin, Jeffry S.; Boucher, Todd; Green, Jeffrey W.; Gustafson, Gary E.; Jurgenson, Ryan; and Lien, Brent D., 5,491,597, Cl. 360-104.000.

Justus, Brian L.; Huston, Alan L.; and Campillo, Anthony J., to United States of America, Navy. Broadband thermal optical limiter for the protection of eyes and sensors. 5,491,579, Cl. 359-241.000.

Justus, George L.; and Karasik, Vladimir, to United Technologies Automotive, Inc. Universal fork wire harness assembly jig. 5,490,664, Cl. 269-66.000.

Justus, George L.: *See*—
Stojkovic, Dragan B.; and Justus, George L., 5,490,663, Cl. 269-32.000.

K-Medic, Inc.: *See*—
Weber, Helmut, 5,490,409, Cl. 72-458.000.

Kabushiki Kaisha Hayashibara Seibutsu Kagaku Kenkyujo: *See*—

Nakagawa, Yoshinori; Kimoto, Tetsuo; and Takeuchi, Makoto, 5,491,151, Cl. 514-311.000.

Kabushiki Kaisha Osaka Packing Seizosho: *See*—
Ide, Tsutomu; and Hamada, Suguru, 5,491,020, Cl. 428-215.000.

Kabushiki Kaisha Toshiba: *See*—
Kato, Yutaka, 5,490,508, Cl. 128-653.500.
Koino, Seiji, 5,491,826, Cl. 395-775.000.
Komoto, Satoshi; Nagasawa, Hiroshi; and Kawasaki, Hitoshi, 5,491,349, Cl. 257-88.000.
Makino, Eiichi; and Koyanagi, Masaru, 5,491,430, Cl. 326-33.000.
Mitsui, Tadashi; Harada, Nozomu; Miyoshi, Motosuke; Sekine, Makoto; Okumura, Katsuya; and Okano, Haruo, 5,491,339, Cl. 250-310.000.
Miyata, Haruyuki, 5,491,358, Cl. 257-546.000.
Murota, Masayuki, 5,491,113, Cl. 437-225.000.
Shimokobe, Jiro; Kamohara, Eiji; and Nishimura, Takashi, 5,491,382, Cl. 315-17.000.
Tomiyasu, Yuichi, 5,491,496, Cl. 345-147.000.
Uesugi, Michika, 5,491,393, Cl. 318-439.000.
Watanabe, Toru; Yonekura, Yuri; and Okumura, Katsuya, 5,491,425, Cl. 324-754.000.

Kabushiki Kaisha Toyota Chuo Kenkyusho: *See*—
Shiga, Tohru; Okada, Akane; Takahashi, Hideroh; and Kurauchi, Toshio, 5,490,426, Cl. 73-762.000.

Kafchinski, Edward R.: *See*—
Chung, Tai-Shung; Kafchinski, Edward R.; and Haubs, Michael, 5,490,931, Cl. 210-500.230.

Kah-Helbig, Astrid: *See*—
Grabowski, Sven; Kah-Helbig, Astrid; Sanner, Axel; and Wendel, Kurt, 5,490,990, Cl. 424-486.000.

Kahr Bearing, a Dover Diversified Company: *See*—
Allard, Larry D.; Granowski, Richard K.; and Neesley, Thomas J., 5,490,432, Cl. 73-865.900.

Kaiser, H. Paul; Mosley, Ellen; Baer, Samuel C.; and Bononcini, Kenneth, to FiberTech Group, Inc. Bulkable porous nonwoven fabric. 5,491,016, Cl. 428-198.000.

Kaisler, Francis J.: *See*—
Bepko, Stephen; McIver, Donald M.; and Kaisler, Francis J., 5,491,095, Cl. 436-518.000.

Kaji, Hitoshi: *See*—
Miyama, Hiroshi; Ohki, Tetsuhiko; Kaji, Hitoshi; Yusa, Yoshiyuki; and Hirose, Yasuo, 5,490,776, Cl. 431-215.000.

Kakeya, Nobuharu: *See*—
Nishimura, Ken-ichi; Yoshimi, Akihisa; Mori, Takayoshi; Kakeya, Nobuharu; Kikuchi, Masahiro; Kondoh, Nobuo; Uchida, Takeshi; and Yamanouchi, Koichi, 5,491,171, Cl. 514-558.000.

Kakiuchi, Makoto: *See*—
Irikura, Takayuki; and Kakiuchi, Makoto, 5,490,527, Cl. 131-280.000.

Kakiwaki, Sigeaki: *See*—
Yamamoto, Tatsushi; Kakiwaki, Sigeaki; Okuda, Tohru; Okada, Hideo; Tsuji, Masaji; Tadera, Takamitsu; and Yoshimoto, Akihito, 5,491,594, Cl. 360-73.040.

Kakuda, Takashi: *See*—
Yamasaki, Futoshi; Ariki, Yoshio; Deguchi, Masaharu; Kakuda, Takashi; Hisada, Takanori; and Maruyama, Takesuke, 5,491,525, Cl. 353-98.000.

Kalapudas, Arja: *See*—
Toivola, Reijo J.; Karjalainen, Arto J.; Kurkela, Kauko O. A.; Soderwall, Marja-Liisa; Kangas, Lauri V. M.; Blanco, Guillermo L.; Sundquist, Hannu K.; and Kalapudas, Arja, 5,491,173, Cl. 514-648.000.

Kaldor, Stephen W.; and Mabry, Thomas E., to Eli Lilly and Company. Inhibitors of HIV protease useful for the treatment of AIDS. 5,491,166, Cl. 514-481.000.

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Mayer, Ulrich; Kaltenbrunn, Peter; Hoeptner, Wolfgang; and Mischker, Karsten, 5,490,489, Cl. 123-630.000.

Kameo, Kazuya: *See*—
Sato, Fumie; Amano, Takehiro; Kameo, Kazuya; Tanami, Tohru; Mutoh, Masaru; Ono, Naoya; and Goto, Jun, 5,491,254, Cl. 560-121.000.

Kamezawa, Jiro, to Tomoe Technical Research Company. Manual device for valve. 5,490,660, Cl. 251-96.000.

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Kamiyama, Takao; Yokoshima, Yasuhiro; and Endoh, Shigeru, to Yokoshima & Company; GET, Inc.; and Shonan Gosei-Jushi Seisakusho K.K. Method and device for repairing a tubular conduit. 5,490,964, Cl. 264-36.000.

Kamohara, Eiji: *See*—
Shimokobe, Jiro; Kamohara, Eiji; and Nishimura, Takashi, 5,491,382, Cl. 315-17.000.

Kamoi, Takeshi: *See*—
Eriguchi, Hiroyasu; Nishimura, Hiroshi; Yamamoto, Minoru; Iwahori, Yutaka; and Kamoi, Takeshi, 5,491,386, Cl. 315-209.00R.

Kaneda, Isami, to Victor Company of Japan, Ltd. Method of color data mapping in color video signal recording to video disc. 5,491,562, Cl. 358-342.000.

Kaneko, Hiroyuki, to Olympus Optical Co., Ltd. Apparatus and method for removing a stopper. 5,490,321, Cl. 29-714.000.

Kaneko, Takushi: *See*—
Coe, Jotham W.; Fliri, Anton F. J.; Kaneko, Takushi; and Larson, Eric R., 5,491,234, Cl. 544-325.000.

Kang, David S.: *See*—
Goodwater, Frank J.; Huynh, Lang D.; and Kang, David S., 5,490,322, Cl. 29-722.000.

Kang, Soon Bang: *See*—
Kim, You Seung; Kang, Soon Bang; and Park, Seon Hee, 5,491,251, Cl. 560-23.000.

Kangas, Lauri V. M.: *See*—
Toivola, Reijo J.; Karjalainen, Arto J.; Kurkela, Kauko O. A.; Soderwall, Marja-Liisa; Kangas, Lauri V. M.; Blanco, Guillermo L.; Sundquist, Hannu K.; and Kalapudas, Arja, 5,491,173, Cl. 514-648.000.

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Kansei Corporation: *See*—
Saito, Shigeru, 5,491,387, Cl. 315-307.000.

Kao Corporation: *See*—
Kiuchi, Kazuhiko; Nakai, Shigeo; Sawa, Masuo; Kato, Masayuki; Sakai, Mitsuru; and Nomura, Shinya, 5,491,180, Cl. 523-139.000.

Kao, Ron: *See*—
Co, Ramon S.; and Kao, Ron, 5,491,729, Cl. 375-376.000.

Kao, Yung-Chung; and Celii, Francis G., to Texas Instruments, Incorporated. Compound semiconductors and a method for thin film growth. 5,490,880, Cl. 118-665.000.

Kaplan, Ronald M.: *See*—
Withgott, M. Margaret; Bagley, Steven C.; Bloomberg, Dan S.; Halvorsen, Per-Kristian; Huttenlocher, Daniel P.; Cass, Todd A.; Kaplan, Ronald M.; and Rao, Ramana R., 5,491,760, Cl. 382-203.000.

Kaplinsky, George T.: *See*—
Swanson, David W.; Carlin, Timothy J.; Kaplinsky, George T.; and Harmon, John P., 5,491,502, Cl. 347-87.000.

Karasik, Vladimir: *See*—
Justus, George L.; and Karasik, Vladimir, 5,490,664, Cl. 269-66.000.

Karjalainen, Arto J.: *See*—
Toivola, Reijo J.; Karjalainen, Arto J.; Kurkela, Kauko O. A.; Soderwall, Marja-Liisa; Kangas, Lauri V. M.; Blanco, Guillermo L.; Sundquist, Hannu K.; and Kalapudas, Arja, 5,491,173, Cl. 514-648.000.

Karlis, Robert G.; and Blumenthal, David S., to Clix Products, Inc. Paper punch. 5,490,440, Cl. 83-599.000.

Karn, Jack L.: *See*—
Smith, Thomas R.; Salomon, Mary F.; Davis, Kirk E.; Karn, Jack L.; and Cahoon, John M., 5,490,945, Cl. 252-18.000.

Kasat, Radhakrishna B.; Lee, Wilson; McCarthy, David R.; and Telyan, Norayr G., to Mennen Company, The. Clear antiperspirant stick gelled with dibenzylidene sorbitol and containing a guanidine compound as gel stabilizer, and process of making same. 5,490,979, Cl. 424-66.000.

Kataoka, Masaaki; Wakai, Akira; and Nakamura, Takehiko, to Uniroyal Chemical Company, Inc. Synergistic insecticidal compositions. 5,491,168, Cl. 514-517.000.

Kataoka, Yoshiyuki; Murase, Michio; Araki, Hidefumi; and Iwata, Yasutaka, to Hitachi, Ltd. Cooling system for primary containment vessel in nuclear power plant and component for use in said cooling system. 5,491,730, Cl. 376-283.000.

Kato, Hideki; Matsuzawa, Tosio; Shimizu, Touru; Yamanaka, Tetsuji; and Kouno, Yoshiyuki, to Nippondenso Co., Ltd. Throttle valve control device. 5,490,487, Cl. 123-399.000.

Kato, Hiroyuki: *See*—
Ogawa, Ryota; and Kato, Hiroyuki, 5,491,588, Cl. 359-676.000.

Kato, Masahiko, to Sanshin Kogyo Kabushiki Kaisha. Catalyzer support system for exhaust cleaning of outboard motor. 5,490,382, Cl. 60-297.000.

Kato, Masayuki: *See*—
Kiuchi, Kazuhiko; Nakai, Shigeo; Sawa, Masuo; Kato, Masayuki; Sakai, Mitsuru; and Nomura, Shinya, 5,491,180, Cl. 523-139.000.

Kato, Yutaka, to Kabushiki Kaisha Toshiba. Magnetic resonance imaging diagnosis apparatus having mat for use with small body. 5,490,508, Cl. 128-653.500.

Kato, Yuuji; and Hagiwara, Yoshichika, to Nissan Motor Co., Ltd. Fuel-cut control system for automobiles with lock-up type automatic transmission. 5,490,815, Cl. 477-181.000.

Katsuie, Ichiro, to Canon Kabushiki Kaisha. Sheet thickness measuring apparatus which measures sheet thickness based on calculated capacity and resistence values of the sheet. 5,491,421, Cl. 324-452.000.

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Katz, Sheila M.: *See*—
Devine, Denise L.; Katz, Sheila M.; Salmon, Peter M.; and Sweet, M. Lynne, 5,490,997, Cl. 426-573.000.

Kau, Chin-Cheng; Ogden, Aubrey D.; and Waldecker, Donald E., to International Business Machines Corporation. Method and system for indexing the assignment of intermediate storage buffers in a superscalar processor system. 5,491,829, Cl. 395-800.000.

Kaub, Kevin F.: *See*—
Conti, Walter; Feemster, William R.; Felts, Jeffrey L.; Fields, Antony J.; Henderson, Robert W.; Howard, Paul L.; Kaub, Kevin F.; Lederman, Joel A.; Lee, Thomas M.; Martinez, Gilbert; Mathews, Mark H.; Patel, Ravi V.; Waldrep, Michael W.; and Wetzel, John H., 5,490,455, Cl. 100-50.000.

Kaufman, Benjamin J.: *See*—
Derosa, Thomas F.; Sung, Rodney L.; and Kaufman, Benjamin J., 5,491,256, Cl. 560-132.000.

Kaufman, Charles W.; Pearlman, Radia J.; and Gasser, Morrie, to Digital Equipment Corporation, Patent Law Group. System for increasing the difficulty of password guessing attacks in a distributed authentication scheme employing authentication tokens. 5,491,752, Cl. 380-30.000.

Kaufman, Leon: *See*—
Carlson, Joseph W.; and Kaufman, Leon, 5,490,509, Cl. 128-653.200.

Kaufmann, Wolf-Dietmar: *See*—
Leupold, Ernst I.; Kaufmann, Wolf-Dietmar; Laugwitz, Bernd; Duchatsch, Günther; and Meyer-Blumenroth, Ulrich, 5,490,936, Cl. 210-636.000.

Kawabe, Takako: *See*—
Niimura, Koichi; Kawabe, Takako; Wada, Tsutomu; Saitoh, Tsuyoshi; and Bannai, Kenji, 5,491,138, Cl. 514-182.000.

Kawaguchi, Masahiro: *See*—
Yamamoto, Nobuko; Tomida, Yasuko; Ohyama, Junji; Nomoto, Tsuyoshi; and Kawaguchi, Masahiro, 5,491,093, Cl. 436-71.000.

Kawakami, Ichiro: *See*—
Yamada, Mitsuo; Kawakami, Ichiro; Nojiri, Hiroyuki; and Ishii, Toshiyuki, 5,491,183, Cl. 523-404.000.

Kawakami, Soichiro, to Canon Kabushiki Kaisha. Method for recovering lithium cell materials. 5,491,037, Cl. 429-49.000.

Kawakami, Tatsuro; Yoshimura, Yuichiro; and Kobayashi, Katsuyuki, to Canon Kabushiki Kaisha. Vibration transmission plate for inputting coordinates. 5,491,305, Cl. 178-19.000.

Kawamoto, Yukari: *See*—
Suzuki, Takahiro; Kawamura, Sukezo; Toriyama, Motohiro; Yokokawa, Yoshiyuki; Kawamoto, Yukari; Hakamatsuka, Yasuharu; and Irie, Hiroyuki, 5,491,082, Cl. 435-176.000.

Kawamura, Sukezo: *See*—
Suzuki, Takahiro; Kawamura, Sukezo; Toriyama, Motohiro; Yokokawa, Yoshiyuki; Kawamoto, Yukari; Hakamatsuka, Yasuharu; and Irie, Hiroyuki, 5,491,082, Cl. 435-176.000.

Kawano, Eiichiro: *See*—
Kyushima, Hiroyuki; Nagura, Koji; Hasegawa, Yutaka; Kawano, Eiichiro; Kuroyanagi, Tomihiko; Atsumi, Akira; and Mizuide, Masuya, 5,491,380, Cl. 313-533.000.

Kawano, Yasubiko: *See*—
Miyake, Akio; Kawano, Yasuhiko; and Ashida, Yasuko, 5,491,145, Cl. 514-248.000.

Kawasaki, Hitoshi: *See*—
Komoto, Satoshi; Nagasawa, Hiroshi; and Kawasaki, Hitoshi, 5,491,349, Cl. 257-88.000.

Kawasaki Steel Corporation: *See*—
Dangi, Ryoichi, 5,491,776, Cl. 395-11.000.

Kawate, Shinichi: *See*—
Yagi, Takayuki; Komatsu, Toshiyuki; Sato, Yasue; and Kawate, Shinichi, 5,490,896, Cl. 156-345.000.

Kawneer Company: *See*—
Grunewald, Fred A.; DeBoy, Dean C.; and Whitmyer, Wayne E., 5,490,358, Cl. 52-235.000.

Kay, Alan C.: *See*—
Clark, Michael R.; Kay, Alan C.; and Ferrara, Thomas, 5,491,477, Cl. 341-20.000.

Kay, David B., to Eastman Kodak Company. Single return path orthogonally-arranged optical focus and tracking sensor system. 5,491,675, Cl. 369-44.230.

Kay, Michael R.; and Thiel, Frank L., V, to Texas Instruments Incorporated. Oscillator compensated for improved frequency stability. 5,491,456, Cl. 331-57.000.

KE-Burgmann A/S: *See*—
Danielsen, Frede; and Jespersen, Carsten, 5,490,813, Cl. 454-306.000.

Kean, James H.; and Kean, Tod M. Bonded insulating batt. 5,491,186, Cl. 524-13.000.

Kean, Thomas A., to Xilinx, Inc. Configurable cellular array. 5,491,353, Cl. 257-208.000.

Kean, Tod M.: *See*—
Kean, James H.; and Kean, Tod M., 5,491,186, Cl. 524-13.000.

Kearney-National, Inc.: *See*—
Maxson, William R.; Heiniger, Jerry D.; and Rustman, James C., 5,491,407, Cl. 324-174.000.

Keaschall, Joseph W.: *See*—
Noble, Stephen W., Jr.; Williams, Norman E.; Stucker, David S.; Segebart, Robert L.; and Keaschall, Joseph W., 5,491,289, Cl. 800-200.000.

Keeley, James W.; Lemay, Richard A.; Nibby, Chester M., Jr.; Petry, Keith L.; and Hirsch, Thomas S., to Bull HN Information Systems Inc. Power-on sequencing apparatus for initializing and testing a system processing unit. 5,491,790, Cl. 395-183.120.

Keen, Dana: *See*—
Klein, Mark D.; and Keen, Dana, 5,491,685, Cl. 370-7.000.

Kei Lau, James C.; Malmgren, Richard P.; and DePace, Ronald A., to TRW Inc. Connector for integrated circuit chips. 5,491,304, Cl. 174-264.000.

Keith, Michael: *See*—
Wickstrom, Larry; Keith, Michael; and Alattar, Adnan, 5,491,513, Cl. 348-390.000.

Keithley Instruments: *See*—
Niemann, James A.; and Topala, George, 5,490,325, Cl. 29-846.000.

Kel Corporation: *See*—
Sugita, Naoki, 5,490,792, Cl. 439-159.000.

Kelkar, Ram; Novof, Ilya I; and Wyatt, Stephen D., to International Business Machines Corporation. Method and apparatus for reducing jitter in a phase locked loop circuit. 5,491,439, Cl. 327-157.000.

Keller, Herbert; and Bergmann, Dietmar, to Siemens Aktiengesellschaft. Method for cooling a low pressure steam turbine operating in the ventilation mode. 5,490,386, Cl. 60-660.000.

Kelly, Elizabeth L.: *See*—
Barber, Gary N.; Greco, Patricia R.; Bogdanowicz, Mitchell J.; and Kelly, Elizabeth L., 5,491,053, Cl. 430-549.000.

Kemeny, Zoltan A., to MM Systems of Arizona. Seismic isolation bearing. 5,490,356, Cl. 52-167.700.

Kemmick, Dennis L.: *See*—
Bowman, Michael E.; Correll, Robert S., Jr.; Dellinger, Donald E.; Kemmick, Dennis L.; and Kocher, Timothy L., 5,490,787, Cl. 439-79.000.

Kendall Medizinische Erzeugnisse GmbH: *See*—
Hecker, Karl-Heinz, 5,490,630, Cl. 239-309.000.

Kenin, Michael; Moore, Steven L.; Schlitzer, Larry T.; and Wendell, Michael J. Mounting mechanism for a roller transfer assembly. 5,491,544, Cl. 355-271.000.

Kenneally, Corey J., to Procter & Gamble Company. Process for preparing polyol polyesters having low levels of triglycerides. 5,491,226, Cl. 536-115.000.

Kennedy, Eugene T.; and Hansen, Neils H., to International Business Machines Corporation. Method and system for N-track correlation. 5,491,645, Cl. 364-516.000.

Kenny, Jonathan E.; and Taylor, Todd A., to Tufts University. Method and system for examining the composition of a fluid or solid sample using fluorescence and/or absorption spectroscopy. 5,491,344, Cl. 250-461.100.

Kepley, Walter R., III: *See*—
Gupta, Prabhat K.; Lamkin, Allan; and Kepley, Walter R., III, 5,491,771, Cl. 395-2.320.

Kerdesky, Francis A.: *See*—
Stuk, Timothy L.; Allen, Michael S.; Haight, Anthony R.; Kerdesky, Francis A.; Langridge, Denton C.; Leanna, M. Robert; Lijewski, Linda M.; Melcher, Laura; Morton, Howard E.; Norbeck, Daniel W.; Reno, Daniel S.; Robbins, Timothy A.; Scarpetti, David; Sham, Hing L.; Sowin, Thomas J.; Tien, Jien-Heh J.; and Zhao, Chen, 5,491,253, Cl. 560-27.000.

Kerdiya, Nidal; and Andes, Richard L., to Teledyne Industries, Inc. Assembly for rapid and accurate testing of encapsulated devices. 5,491,419, Cl. 324-418.000.

Kerko, David J.; and Wedding, Brent M., to Corning Incorporated. Optical filter glasses. 5,491,117, Cl. 501-13.000.

Kern, Calvin V.: *See*—
Bartell, Robert J.; and Kern, Calvin V., 5,490,721, Cl. 303-116.400.

Kerth, Jürgen: *See*—
Langhauser, Franz; Kerth, Jürgen; Schweier, Günther; Brintzinger, Hans-Herbert; Mansel, Stefan; Roell, Werner; and Kirsten, Robin, 5,491,205, Cl. 526-121.000.

Kertis, Robert A.: *See*—
Goetschel, Christian J.; Greene, Robert A.; Kertis, Robert A.; Philpott, Rick A.; Richetta, Raymond A.; Schmerbeck, Timothy J.; Schulte, Donald J.; and Swart, David P., 5,491,441, Cl. 327-291.000.
Goetschel, Christian J.; Greene, Robert A.; Kertis, Robert A.; Philpott, Rick A.; Richetta, Raymond A.; Schmerbeck, Timothy J.; Schulte, Donald J.; and Swart, David P., 5,491,447, Cl. 330-254.000.

Kestly, Michael J.: *See*—
Plunkett, Thomas P.; and Kestly, Michael J., 5,490,681, Cl. 277-235.00B.

Key, Andrew: *See*—
Fyles, Anthony; Key, Andrew; and Sethi, Vincent, 5,491,780, Cl. 395-153.000.

Key, Charles R.; and Shih, Yen-Jer, to National Starch and Chemical Investment Holding Corporation. Glass fiber sizing compositions and methods of using same. 5,491,182, Cl. 523-206.000.

Key, Idea Development: *See*—
Janik, Craig M., 5,491,651, Cl. 364-708.100.

Khanuja, Satbir: *See*—
Sachs, Emanuel M.; Cima, Michael J.; Bredt, James F.; and Khanuja, Satbir, 5,490,882, Cl. 134-1.000.

Kiani-Azarbayjany, Esmaiel: *See*—
Diab, Mohamed K.; Kiani-Azarbayjany, Esmaiel; and Weber, Walter M., 5,490,505, Cl. 128-633.000.

Kihara, Nobuyuki: *See*—
Aramaki, Junichi; and Kihara, Nobuyuki, 5,491,592, Cl. 360-59.000.

Kikinis, Dan, to Consilium Overseas Limited. Selective call waiting. 5,491,744, Cl. 379-215.000.

Kikuchi, Juro: *See*—
Oshikiri, Minoru; and Kikuchi, Juro, 5,491,527, Cl. 354-195.120.

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Nishimura, Ken-ichi; Yoshimi, Akihisa; Mori, Takayoshi; Kakeya, Nobuharu; Kikuchi, Masahiro; Kondoh, Nobuo; Uchida, Takeshi; and Yamanouchi, Koichi, 5,491,171, Cl. 514-558.000.

Kilduff, Edward H.: *See*—
Ancona, Bruce; and Kilduff, Edward H., 5,490,454, Cl. 99-510.000.

Kilis, Danny, to International Business Machines Corporation. Method and system for incremental processing of computer objects. 5,491,821, Cl. 395-700.000.

Kim, Anderson H.; Youmans, Robert J.; Saddow, Stephen E.; Jasper, Louis J., Jr.; and Weiner, Maurice, to United States of America, Army. Photon-triggered RF radiator having discrete energy storage and energy radiation sections. 5,491,490, Cl. 343-895.000.

Kim, Dong K.: *See*—
Prakash, Amit; Kim, Dong K.; Shemenski, Robert M.; and Lewis, William C., 5,490,551, Cl. 152-556.000.

Kim, Heon D., to Hyundai Electronics Industries Co., Ltd. Method for forming a contact hole in a semiconductor device. 5,490,901, Cl. 156-643.100.

Kim, Hyeong Soo; and Won, Tai Kiyung. Method of removing a silylated or germanium implanted photoresist. 5,491,047, Cl. 430-329.000.

Kim, Jae G., to Hyundai Electronics Industries Co., Ltd. Method for the construction of highly integrated semiconductor connecting device. 5,491,109, Cl. 437-195.000.

Kim, Jong-Hoon, to Daewoo Electronics Co., Ltd. Pre-processing filter apparatus for use in an image encoding system. 5,491,519, Cl. 348-620.000.

Kim, Ki I.; and Rho, Soo K. Method for preparing grain cake health soup. 5,490,998, Cl. 426-589.000.

Kim, Peter K.: *See*—
Martin, Patrick H.; Bales, Stephen E.; Kim, Peter K.; and Wessling, Ritchie A., 5,490,967, Cl. 264-322.000.

Kim, Sang H., to Eastman Kodak Company. Silver halide photographic emulsions prepared and sensitized in the presence of sulfodihydroxy aryl compounds. 5,491,055, Cl. 430-567.000.

Kim, Tae E., to SamSung Electronics Co., Ltd. Quantization step size adjusting circuit using edge detections. 5,491,761, Cl. 382-251.000.

Kim, Yeong-U; Zaremski, Donald R.; and Hertzler, Carol S., to Allegheny Ludlum Corporation. Annealing and descaling method for stainless steel. 5,490,908, Cl. 148-241.000.

Kim, Yoon: *See*—
Horstmann, Jens; and Kim, Yoon, 5,491,806, Cl. 395-417.000.

Kim, You Seung; Kang, Soon Bang; and Park, Seon Hee, to Korea Institute of Science and Technology. 2-benzoyl-3-aminoacrylate derivatives and methods for the preparation of the same. 5,491,251, Cl. 560-23.000.

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Kim, Young-Sang, to Daewoo Electronics Co., Ltd. Equalization apparatus with fast coefficient updating operation. 5,491,518, Cl. 348-607.000.

Kimberly-Clark Corporation: *See*—
Chen, Franklin M. C.; and Druecke, Frank G., 5,490,903, Cl. 162-111.000.
Ellis, Clifford J.; and Everett, Rob D., 5,490,846, Cl. 604-366.000.
Onwumere, Fidelis C.; and Pazos, Jose F., 5,491,210, Cl. 528-28.000.

Kimoto, Koichi, to Sumitomo Wiring Systems Ltd (a corp. of Japan). Continuous terminal crimping machine. 5,490,316, Cl. 29-564.400.

Kimoto, Tetsuo: *See*—
Nakagawa, Yoshinori; Kimoto, Tetsuo; and Takeuchi, Makoto, 5,491,151, Cl. 514-311.000.

Kimura, Kazuhiro: *See*—
Inui, Tetsuya; Hirata, Susumu; Ishii, Yorishige; Ohta, Kenji; and Kimura, Kazuhiro, 5,491,500, Cl. 347-48.000.

Kimura, Yoshiharu: *See*—
Ikeda, Naoki; Yoshimura, Masafumi; Mizoguchi, Kazuaki; and Kimura, Yoshiharu, 5,491,188, Cl. 524-229.000.

Kinetico Incorporated: *See*—
Hansen, Christopher L.; and Park, Stuart L., 5,490,932, Cl. 210-541.000.

King, Chen D.; Lee, Raymond E.; Scannell, Peter; and Torres, Robert J., to International Business Machines Corporation. Method and apparatus for loosely ganging sliders on a user interface of a data processing system. 5,491,782, Cl. 395-159.000.

King, David A.: *See*—
Brandenburg, Scott D.; Murphy, William S.; Syed, Ahmer R.; King, David A.; and Yeh, Shing, 5,491,364, Cl. 257-786.000.

Kingston, Paul W.: *See*—
Coates, John R.; and Kingston, Paul W., 5,490,871, Cl. 95-23.000.

Kinichi Uemura: *See*—
Ohtsubo, Kazuo; and Uemura, Kinichi, 5,491,452, Cl. 327-552.000.

Kinoshita, Takuji: *See*—
Idei, Gijun; Kinoshita, Takuji; and Hoshino, Kunio, 5,491,381, Cl. 313-589.000.

Kinsel, John R., to Silicon Graphics, Inc. Apparatus for detecting any single bit error, detecting any two bit error, and detecting any three or four bit error in a group of four bits for a 25- or 64-bit data word. 5,491,702, Cl. 371-37.200.

Kioritz Corporation: *See*—
Ishimura, Tadashi; and Adachi, Syouji, 5,490,921, Cl. 210-149.000.

Kipp, Jim: *See*—
Finley, Mike; Scharf, Mike; Packard, Jeff; Kipp, Jim; Dudar, Tom; Owens, Jim; and Bindokas, Al, 5,490,848, Cl. 604-403.000.

Kirin Beer Kabushiki Kaisha: *See*—
Ishida, Isao; and Okada, Yoshimi, 5,491,080, Cl. 435-172.300.

Kirkpatrick, Carole W.: *See*—
Kirkpatrick, William D.; and Kirkpatrick, Carole W., 5,490,889, Cl. 106-709.000.

Kirkpatrick, William D.; and Kirkpatrick, Carole W. Blended hydraulic cement for both general and special applications. 5,490,889, Cl. 106-709.000.

Kirschbaum, Alan R.: *See*—
Lehmer, Donald E.; and Kirschbaum, Alan R., 5,491,757, Cl. 382-128.000.

Kirsten, Robin: *See*—
Langhauser, Franz; Kerth, Jürgen; Schweier, Günther; Brintzinger, Hans-Herbert; Mansel, Stefan; Roell, Werner; and Kirsten, Robin, 5,491,205, Cl. 526-121.000.

Kistenmacher, John C.: *See*—
Glowny, David A.; Kistenmacher, John C.; Rahn, Caryl M.; and Thomas, Jerry C., 5,491,791, Cl. 395-183.130.

Kitahara, Shinichi, to NEC Corporation. Disk-reproduced signal equalizer for use in constant wave length-constant angular velocity scheme. 5,491,674, Cl. 369-32.000.

Kitamura, Atsushi, to Ando Electric Co., Ltd. Wavelength-variable semiconductor laser light source. 5,491,714, Cl. 372-92.000.

Kitamura, Keiichi; Honda, Shin; and Sakakibara, Hisayoshi, to Nippondenso Co., Ltd. Water removing device in refrigerating system. 5,490,397, Cl. 62-474.000.

Kitayama, Kunihiko: *See*—
Nagashima, Toshiaki; Kitayama, Kunihiko; and Oyama, Kiyoshi, 5,491,542, Cl. 355-260.000.

Kitayama, Tadashi; and Onishi, Ichiro, to Aprica Kassai Kabushikikaisha. Baby carriage. 5,490,685, Cl. 280-47.380.

Kitazawa, Eiichi: *See*—
Ishihara, Sadao; Kogen, Hiroshi; Koga, Teiichiro; Kitazawa, Eiichi; and Serizawa, Nobufusa, 5,491,167, Cl. 514-510.000.

Kitazume, Hideaki: *See*—
Kozawa, Hideaki; Kojima, Kazuo; Ono, Tomoyuki; Yanagawa, Hirofumi; Kitazume, Hideaki; and Taguchi, Kouji, 5,490,867, Cl. 29-623.200.

Kito, Tsutomu; Senga, Kuniyuki; and Hayashi, Hiroyuki, to Pilot Ink Co., Ltd. Thermochromic opaque composition, laminate member employing the same, and three-dimensional member employing said laminate member and capable of concealing and revealing the interior. 5,490,956, Cl. 252-583.000.

Kiuchi, Kazuhiko; Nakai, Shigeo; Sawa, Masuo; Kato, Masayuki; Sakai, Mitsuru; and Nomura, Shinya, to Kao Corporation. Binder composition for mold making, binder/curing agent composition for mold making, sand composition for mold making, and process of making mold. 5,491,180, Cl. 523-139.000.

Kjer, Michael L.: *See*—
Smick, Gary L.; Kjer, Michael L.; and Koler, Michael B., 5,490,336, Cl. 34-97.000.

Klecka, Gary M.: *See*—
LaPack, Mark A.; Nestrick, Terry J.; Martin, William F.; and Klecka, Gary M., 5,490,933, Cl. 210-603.000.

Klein, Hans W.; and Narayan, Sriram, to I M P, Inc. Peak detector for amplitude modulated signals. 5,491,681, Cl. 369-124.000.

Klein, Mark D.; and Keen, Dana, to Digital Pictures, Inc. System and method of digital compression and decompression using scaled quantization of variable-sized packets. 5,491,685, Cl. 370-7.000.

Kleinschmidt, Dieter, to Elmotec GmbH. Method for the manufacture of stator-or-rotor-windings for electrical machines from parallel-wires. 5,490,318, Cl. 29-596.000.

Klier, John; Strandburg, Gary M.; and Tucker, Christopher J., to Dowbrands Inc. Translucent solid prespotting composition. 5,490,948, Cl. 252-122.000.

Klimstra, Jacob; and De Voogd, Abraham, to Deltec Fuel Systems B.V. Method and device for the measuring and monitoring of electrical spark gaps during operation. 5,491,416, Cl. 324-393.000.

Kline, Barry D.: *See*—
Lim, Chun B.; Kline, Barry D.; Jiang, Jinghua J.; and Rappoport, Vitaliy, 5,491,342, Cl. 250-363.090.

Klippert, Uwe, to Brose Fahrezeugteile GmbH & Co. Kommanditgesellschaft. Cable mechanism for raising and lowering windows of motor vehicles. 5,490,354, Cl. 49-352.000.

Kluge, Klaus-Peter: *See*—
Brandenburg, Klaus; Kluge, Klaus-Peter; Richter, Kurt-Hermann; and Weber, Wendelin, 5,490,735, Cl. 400-614.000.

Knapp, R. Benjamin; Hake, Lisa E.; and Lusted, Hugh S., to Biocontrol Systems, Inc. Method and apparatus for eye tracking for convergence and strabismus measurement. 5,491,492, Cl. 345-8.000.

Knauth, Philippe; Lange, Horst; Schwirtlich, Ingo; and Wambach, Karsten, to Bayer Aktiengesellschaft. Process for the production of semiconductor foils and their use. 5,490,477, Cl. 117-43.000.

Knight, Robert J.; and Highwood, David P., to American Cyanamid Co. Pesticidal methods and compositions employing a triazole and a pyrethroid. 5,491,160, Cl. 514-384.000.

Knol, Jan; Marciset, Olivier; and Mollet, Beat, to Nestec S.A. Promoterless foreign gene integrated in *Streptococcus thermophilus*. *5,491,079, Cl. 435-172.300.*

Knussmann, Kevin D.: *See*—
O'Brien, Michael J.; Carabbio, Robert M.; Hemsath, Bill; Knussmann, Kevin D.; and Robbins, Thomas C., 5,491,647, Cl. 364-551.020.

Knüttel, Alexander, to Bruker Medizintechnik. Optical interferometer employing mutually coherent light source and an array detector for imaging in strongly scattered media. 5,491,552, Cl. 356-360.000.

Ko, Soo S.: *See*—
Wilde, Richard G.; Ko, Soo S.; and Billheimer, Jeffrey T., 5,491,152, Cl. 514-336.000.

Ko, Tsung M.: *See*—
Cheng, Cheden; Huang, Shih S.; Ko, Tsung M.; and Su, Hsin C., 5,491,384, Cl. 315-169.300.

Koba, Masayoshi: *See*—
Nojima, Hideo; Shintaku, Hidetaka; Nagata, Masaya; Fujimoto, Manabu; and Koba, Masayoshi, 5,491,410, Cl. 324-248.000.

Kobayashi, Junichi: *See*—

Suzuki, Toshio; Saito, Asao; Shibata, Makoto; Kobayashi, Junichi; Komuro, Hirokazu; Mori, Toshihiro; Koyama, Shuji; Yokoyama, Sakai; Koizumi, Ryoichi; and Murakami, Keiichi, 5,491,505, Cl. 347-203.000.

Kobayashi, Katsuyuki: *See*—
Kawakami, Tatsuro; Yoshimura, Yuichiro; and Kobayashi, Katsuyuki, 5,491,305, Cl. 178-19.000.

Kobayashi, Kouichi: *See*—
Hagiwara, Shinji; Kobayashi, Kouichi; Shimokawa, Kouji; and Nishimoto, Kenichi, 5,490,573, Cl. 180-68.100.

Kobayashi, Makoto; Naitou, Tsutomu; and Kurata, Kazunori, to Sumitomo Wiring Systems, Ltd. Branch joint box. 5,490,794, Cl. 439-212.000.

Kobayashi, Makoto: *See*—
Shiio, Ichiro; and Kobayashi, Makoto, 5,491,743, Cl. 379-202.000.

Kobayashi, Toshiaki: *See*—
Okada, Tsuyoshi; Kobayashi, Toshiaki; and Ozawa, Hidetaka, 5,491,446, Cl. 327-551.000.

Kobe Steel USA, Inc.: *See*—
Koyamao, Hisasi; Miyata, Koichi; Saito, Kimitsugu; Dreifus, David L.; and Stoner, Brian R., 5,491,348, Cl. 257-66.000.

Kobori, Seiki, to NEC Corporation. Pressure-differential passageway for cleaning a magnetic disk drive. 5,491,596, Cl. 360-97.030.

Kobos, Robert K.: *See*—
Arentzen, Rene; Jadhav, Prabhakar K.; Kobos, Robert K.; and Smart, Bruce E., 5,491,083, Cl. 435-181.000.

Kocal, Joseph A.: *See*—
Stine, Laurence O.; Hammershaimb, Harold U.; and Kocal, Joseph A., 5,491,277, Cl. 585-719.000.

Kocher, Timothy L.: *See*—
Bowman, Michael E.; Correll, Robert S., Jr.; Dellinger, Donald E.; Kemmick, Dennis L.; and Kocher, Timothy L., 5,490,787, Cl. 439-79.000.

Kocur, Jean: *See*—
Albrecht, Konrad; Kocur, Jean; and Langelüddeke, Peter, 5,491,125, Cl. 504-206.000.

Kodaira, Hideki: *See*—
Maro, Hideharu; Kodaira, Hideki; Iwase, Hiroshi; and Komiya, Yuji, 5,491,018, Cl. 428-200.000.

Kodota, Akihiko: *See*—
Hiyamuta, Shuichi; Shimizu, Keiko; and Kodota, Akihiko, 5,491,066, Cl. 435-7.400.

Koga, Hiroki: *See*—
Suzuki, Mieko; Homma, Tetsuya; Murao, Yukinobu; Tanigawa, Takaho; and Koga, Hiroki, 5,491,108, Cl. 437-192.000.

Koga, Teiichiro: *See*—
Ishihara, Sadao; Kogen, Hiroshi; Koga, Teiichiro; Kitazawa, Eiichi; and Serizawa, Nobufusa, 5,491,167, Cl. 514-510.000.

Kogen, Hiroshi: *See*—
Ishihara, Sadao; Kogen, Hiroshi; Koga, Teiichiro; Kitazawa, Eiichi; and Serizawa, Nobufusa, 5,491,167, Cl. 514-510.000.

Kohler, Peter: *See*—
Schertler, Roman; Haag, Walter; and Kohler, Peter, 5,490,913, Cl. 204-298.200.

Koino, Seiji, to Kabushiki Kaisha Toshiba. Microprocessor having register bank and using a general purpose register as a stack pointer. 5,491,826, Cl. 395-775.000.

Koizumi, Ryoichi: *See*—
Suzuki, Toshio; Saito, Asao; Shibata, Makoto; Kobayashi, Junichi; Komuro, Hirokazu; Mori, Toshihiro; Koyama, Shuji; Yokoyama, Sakai; Koizumi, Ryoichi; and Murakami, Keiichi, 5,491,505, Cl. 347-203.000.

Koizumi, Yoshimasa: *See*—
Hamada, Akihiko; Koizumi, Yoshimasa; Hiraoka, Hidenori; and Yabuki, Yoshikazu, 5,490,674, Cl. 273-228.000.

Kojima, Kazuo: *See*—
Kozawa, Hideaki; Kojima, Kazuo; Ono, Tomoyuki; Yanagawa, Hirofumi; Kitazume, Hideaki; and Taguchi, Kouji, 5,490,867, Cl. 29-623.200.

Kokubo, Kazuo: *See*—
Shirane, Yoshiyuki; Iwasa, Seiichi; Suzuki, Yoshio; Kuramochi, Kiyoshi; Kokubo, Kazuo; Ohno, Tetsuya; Mizuno, Kimio; and Satoh, Takashi, 5,491,631, Cl. 364-424.040.

Kokusenya, Noboru: *See*—
Itakura, Keijirou; Nobusada, Toshihide; Toyoda, Yasuyuki; Saitoh, Yukio; Kokusenya, Noboru; Nagayoshi, Ryouichi; Tanaka, Hironori; and Ozaki, Masayoshi, 5,491,512, Cl. 348-321.000.

Koler, Michael B.: *See*—
Smick, Gary L.; Kjer, Michael L.; and Koler, Michael B., 5,490,336, Cl. 34-97.000.

Komatsu, Toshiyuki: *See*—
Yagi, Takayuki; Komatsu, Toshiyuki; Sato, Yasue; and Kawate, Shinichi, 5,490,896, Cl. 156-345.000.

Komiya, Yuji: *See*—
Maro, Hideharu; Kodaira, Hideki; Iwase, Hiroshi; and Komiya, Yuji, 5,491,018, Cl. 428-200.000.

Komoto, Satoshi; Nagasawa, Hiroshi; and Kawasaki, Hitoshi, to Kabushiki Kaisha Toshiba. Multi-color light emitting device. 5,491,349, Cl. 257-88.000.

Komuro, Hirokazu: *See*—
Suzuki, Toshio; Saito, Asao; Shibata, Makoto; Kobayashi, Junichi; Komuro, Hirokazu; Mori, Toshihiro; Koyama, Shuji; Yokoyama, Sakai; Koizumi, Ryoichi; and Murakami, Keiichi, 5,491,505, Cl. 347-203.000.

Koncsek, Joseph L.; and McMahon, Steven L., to Boeing Company, The. Ducted boundary layer diverter. 5,490,644, Cl. 244-53.00B.

Kondo, Masafumi: *See*—
Seki, Akinori; Hosoba, Hiroyuki; Hata, Toshio; Kondo, Masafumi; Suyama, Takahiro; and Matsui, Sadayoshi, 5,491,106, Cl. 437-107.000.

Kondo, Mitsuji; and Sawada, Takeo, to Hojun Kogyo Co., Ltd. Readily dispersible bentonite. 5,491,248, Cl. 556-173.000.

Kondo, Setsu: *See*—
Hirose, Toshihiko; Ohbayashi, Shigeki; Kondo, Setsu; Hayasaka, Takashi; Fujino, Yoshiyuki; and Iketani, Masayuki, 5,491,655, Cl. 365-177.000.

Kondoh, Nobuo: *See*—
Nishimura, Ken-ichi; Yoshimi, Akihisa; Mori, Takayoshi; Kakeya, Nobuharu; Kikuchi, Masahiro; Kondoh, Nobuo; Uchida, Takeshi; and Yamanouchi, Koichi, 5,491,171, Cl. 514-558.000.

Kondoh, You: *See*—
Ueno, Toshiaki; and Kondoh, You, 5,491,427, Cl. 324-754.000.

Kone Oy: *See*—
Aulanko, Esko; Mustalahti, Jorma; and Hakala, Harri, 5,490,578, Cl. 187-254.000.

Konings, Frank J.: *See*—
Noppe, Marcus J. M.; and Konings, Frank J., 5,491,098, Cl. 436-525.000.

Koninklijke PTT Nederland N.V.: *See*—
van Deventer, Mattijs O.; and van Der Tol, Johannes J. G. M., 5,491,763, Cl. 385-24.000.

Konno, Taichiro: *See*—
Unno, Tsunehiro; and Konno, Taichiro, 5,491,350, Cl. 257-99.000.

Kopp, Walter; and Windele, Josef, to Siemens Aktiengesellschaft. Electrophotographic printer for reel paper having a thermal print fixing station. 5,491,545, Cl. 355-290.000.

Korea Institute of Science and Technology: *See*—
Kim, You Seung; Kang, Soon Bang; and Park, Seon Hee, 5,491,251, Cl. 560-23.000.

Korpela, Thomas J., to Vöest-Alpine Services and Technologies Corp. Method of controlling forces applied to a continuously cast product. 5,490,555, Cl. 164-454.000.

Korzekwa, Richard A.: *See*—
Grothaus, Michael G.; Korzekwa, Richard A.; and Hutcherson, R. Kenneth, 5,490,973, Cl. 422-186.040.

Koshi, Enathickal J., to International Business Machines Corporation. System and method for improved efficiency and deadlock prevention in communication interfaces utilizing a first-in-first-out action queue. 5,491,824, Cl. 395-732.000.

Kostas, John N., to Hercules Incorporated. Process for preparing cyclic polysiloxanes from linear polysiloxanes. 5,491,249, Cl. 556-460.000.

Kostopolos, Peter; and Facco, Giuseppe, to Italimpianti of America, Inc. Method and apparatus for continuously hot rolling strip. 5,490,315, Cl. 29-527.700.

Koths, Kirston E.: *See*—
Halenbeck, Robert F.; Koths, Kirston E.; and Wrin, Joseph W., 5,491,065, Cl. 435-7.100.

Kotter, Rodman W., to Quilite International Limited Liability Company. Acoustical panel system. 5,491,309, Cl. 181-285.000.

Kotzur, Joachim, to Man Gutehoffnungshütte AG. Multishaft geared multishaft turbocompressor with return channel stages and radial expaner. 5,490,760, Cl. 415-68.000.

Kouno, Yoshiyuki: *See*—
Kato, Hideki; Matsuzawa, Tosio; Shimizu, Touru; Yamanaka, Tetsuji; and Kouno, Yoshiyuki, 5,490,487, Cl. 123-399.000.

Kourtakis, Kostantinos: *See*—
Herkes, Frank E.; and Kourtakis, Kostantinos, 5,491,264, Cl. 558-431.000.

Kouwa, Tatsuki: *See*—
Iwatani, Shirou; and Kouwa, Tatsuki, 5,491,400, Cl. 322-28.000.

Kovac, Zlata: *See*—
Distefano, Thomas H.; Kovac, Zlata; and Grange, John, 5,491,302, Cl. 114-260.000.

Koyama, Kouhei, to Seed Rubber Company Limited. Coating film transfer tool. 5,490,898, Cl. 156-540.000.

Koyama, Ryo; and Bartlett, Niall M. Digital audio delivery in a graphics controller architecture. 5,491,498, Cl. 345-190.000.

Koyama, Shuji: *See*—
Suzuki, Toshio; Saito, Asao; Shibata, Makoto; Kobayashi, Junichi; Komuro, Hirokazu; Mori, Toshihiro; Koyama, Shuji; Yokoyama, Sakai; Koizumi, Ryoichi; and Murakami, Keiichi, 5,491,505, Cl. 347-203.000.

Koyamao, Hisasi; Miyata, Koichi; Saito, Kimitsugu; Dreifus, David L.; and Stoner, Brian R., to Kobe Steel USA, Inc. Highly-oriented diamond film field-effect transistor. 5,491,348, Cl. 257-66.000.

Koyanagi, Ichiroh; Ohtuki, Makoto; Ohsawa, Fumitomo; and Satoh, Takayuki, to International Business Machines Corporation. Shockproof and portable disk storage apparatus having shock absorbers on all sides of a head/disk enclosure and a coplanar electronic card. 5,491,608, Cl. 361-685.000.

Koyanagi, Masaru: *See*—

Makino, Eiichi; and Koyanagi, Masaru, 5,491,430, Cl. 326-33.000.
Kozawa, Hideaki; Kojima, Kazuo; Ono, Tomoyuki; Yanagawa, Hirofumi; Kitazume, Hideaki; and Taguchi, Kouji, to Toshiba Battery Co., Ltd. Method of making a rectangular nickel-metal hydride secondary cell. 5,490,867, Cl. 29-623.200.
Kraemer, Mark S.; and Ratliff, James A., to Amoco Corporation. Method of creating a comprehensive manufacturing, shipping and location history for pipe joints. 5,491,637, Cl. 364-468.000.
Kraft Foods, Inc.: *See*—
Soedjak, Helena S., 5,490,994, Cl. 426-262.000.
Kraft Jacobs Suchard AG: *See*—
Despland, Claude; Gnagi, Christophe; and Podavini, Giacomo, 5,490,996, Cl. 426-548.000.
Kraft, Mark E.: *See*—
Borrino, Thomas; and Kraft, Mark E., 5,490,679, Cl. 277-65.000.
Kraley, Michael F.: *See*—
Belove, Edward; Culbert, James A.; Johnson, R. Patrick; Heath, David M.; Kraley, Michael F.; Méndez, Deborah; Pant, Sangam; and Zagieboylo, Stephen, 5,491,820, Cl. 395-600.000.
Kramer, David E.: *See*—
Hadaway, Michelle A.; Kramer, David E.; and Best, Robert J., 5,490,989, Cl. 424-484.000.
Kramer, Paul F., to Mountian Hardwear, Inc. Sleeping bag with removable bag liner. 5,490,294, Cl. 5-413.000.
Krantz, Kermit T.: *See*—
Rake, Lance G.; and Krantz, Kermit T., 5,490,676, Cl. 273-294.000.
Krasser, Fritz; and Schmidt, Wolfgang, to Ellenberger & Poensgen GmbH. Instrument switch having integrated overcurrent protection. 5,491,460, Cl. 337-70.000.
Kratsch, Peter K.; and Hahnen, Kevin F., to Symbiosis Corporation. Track guided end effector assembly for use with endoscopic instruments. 5,490,861, Cl. 606-205.000.
Krattenmacher, Rolf: *See*—
Bull, James R.; Elger, Walter; Fritzemeier, Karl-Heinrich; and Krattenmacher, Rolf, 5,491,137, Cl. 514-182.000.
Krause, William R.: *See*—
Azer, Samir N.; and Krause, William R., 5,490,852, Cl. 606-79.000.
Kreitman, Haim; Bar-El, Dan; Amir, Yoel; and Tirosh, Ehud, to Scitex America Corporation. System for implanting an image into a video stream. 5,491,517, Cl. 348-581.000.
Kreuzenztein, Ronald K.; Vongnechten, Mark; and Wong, Kai C., to Amdahl Corporation. Communication interface for uniform communication among hardware and software units of a computer system. 5,491,799, Cl. 395-200.080.
Kreuzer GmbH + Co. OHG: *See*—
Martin, Karl-Heinz, 5,490,652, Cl. 248-282.100.
Krinner GmbH: *See*—
Eisenschenk, Johann; and Krinner, Klaus, 5,490,350, Cl. 47-40.500.
Krinner, Klaus: *See*—
Eisenschenk, Johann; and Krinner, Klaus, 5,490,350, Cl. 47-40.500.
Krones AG Hermann Kronseder Maschinenfabrik: *See*—
Eder, Erich, 5,491,010, Cl. 428-35.700.
Kronmiller, Frederick B.: *See*—
Fruchtbaum, Joseph; and Kronmiller, Frederick B., 5,490,920, Cl. 210-112.000.
Krössmann, Jürgen: *See*—
Golz, Peter; Rinke, Andreas; and Krössmann, Jürgen, 5,490,589, Cl. 198-444.000.
Krounbi, Mohamad T.: *See*—
Chen, Mao-Min; Gutberlet, Mary K.; Krounbi, Mohamad T.; Latimer, Jacqueline K.; and Pinarbasi, Mustafa, 5,491,600, Cl. 360-113.000.
Kruke, Jeffrey J.: *See*—
Davis, Dennis; Beam, Harold D.; and Kruke, Jeffrey J., 5,490,726, Cl. 366-152.100.
Krull, Timothy L., to Baldwin Filters, Inc. Filter. 5,490,930, Cl. 210-443.000.
Krum, Alvin L.; and Campbell, William T., to Hughes Aircraft Company. Direct bonding of copper composites to ceramics. 5,490,627, Cl. 228-124.100.
Krutzsch, Henry C.: *See*—
Roberts, David D.; Krutzsch, Henry C.; Sipes, John M.; Guo, Neng-hua; and Negre, Eric, 5,491,130, Cl. 514-13.000.
Kubert, Vincent T., to Microtek Industries, Inc. Tapered alignment guide arrangement for self aligning part excision die members in tape automated bonding apparatus. 5,490,317, Cl. 29-564.700.
Kubota Corporation: *See*—
Ishiizumi, Seiichi; Nakata, Yasuo; Hirata, Kazuo; and Nakashima, Akinori, 5,490,574, Cl. 180-68.100.
Ishino, Renshiro; Saito, Taro; and Sunahata, Matsumi, 5,491,369, Cl. 310-26.000.
Kuchta, Ron. Environmentally friendly color-coded forms and method for creating same. 5,491,121, Cl. 503-200.000.
Kuck, Karl-Heinz: *See*—
Dehne, Heinz-Wilhelm; Brandes, Wilhelm; Kuck, Karl-Heinz; and Seitz, Thomas, 5,491,165, Cl. 514-479.000.
Kuczynski, Krzysztof, to Monsanto Company. Process of inhibiting oxalate scale formation. 5,490,942, Cl. 210-700.000.
Kugler, Edwin L.: *See*—
Polizzotti, Richard S.; McCandlish, Larry E.; and Kugler, Edwin L., 5,490,968, Cl. 419-2.000.
Kumada, Katsumi: *See*—
Suzuki, Mitsuo; Terashima, Isamu; and Kumada, Katsumi, 5,491,537, Cl. 355-245.000.
Kumagai, Toshimitsu: *See*—
Sato, Shinichi; Kumagai, Toshimitsu; Iwaguchi, Isao; and Shinoda, Ichiro, 5,491,330, Cl. 250-214.0AL.
Kumar, Surendra: *See*—
Wallach, Donald F. H.; Mathur, Rajiv; Philippot, Jean; and Kumar, Surendra, 5,490,985, Cl. 424-450.000.
Kump, Daniel J., to Fasteners For Retail, Inc. Hinged ceiling clip. 5,490,651, Cl. 248-222.120.
Kuo, Betsy P., to W. R. Grace & Co.-Conn. Oxygen-permeable multilayer film. 5,491,019, Cl. 428-213.000.
Kuo, James R., to National Semiconductor Corporation. Differential-to-single ended translator that generates an output signal with very small signal distortion. 5,491,455, Cl. 330-253.000.
Kuramochi, Kiyoshi: *See*—
Shirane, Yoshiyuki; Iwasa, Seiichi; Suzuki, Yoshio; Kuramochi, Kiyoshi; Kokubo, Kazuo; Ohno, Tetsuya; Mizuno, Kimio; and Satoh, Takashi, 5,491,631, Cl. 364-424.040.
Kurata, Kazunori: *See*—
Kobayashi, Makoto; Naitou, Tsutomu; and Kurata, Kazunori, 5,490,794, Cl. 439-212.000.
Kurauchi, Toshio: *See*—
Shiga, Tohru; Okada, Akane; Takahashi, Hideroh; and Kurauchi, Toshio, 5,490,426, Cl. 73-762.000.
Kureha Kagaku Kogyo Kabushiki Kaisha: *See*—
Niimura, Koichi; Kawabe, Takako; Wada, Tsutomu; Saitoh, Tsuyoshi; and Bannai, Kenji, 5,491,138, Cl. 514-182.000.
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Toivola, Reijo J.; Karjalainen, Arto J.; Kurkela, Kauko O. A.; Soderwall, Marja-Liisa; Kangas, Lauri V. M.; Blanco, Guillermo L.; Sundquist, Hannu K.; and Kalapudas, Arja, 5,491,173, Cl. 514-648.000.
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Bustos, Rafael T., 5,490,600, Cl. 211-187.000.
L. S. Research, Inc.: *See*—
Schotz, Larry, 5,491,839, Cl. 455-66.000.
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Lambert, Howard S.: *See*—
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Landis, Robert M. Safety sheath device. 5,490,841, Cl. 604-110.000.

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Lange, Horst: *See*—
Knauth, Philippe; Lange, Horst; Schwirtlich, Ingo; and Wambach, Karsten, 5,490,477, Cl. 117-43.000.

Lange, Peter: *See*—
Vom Dahl, Uwe; Lange, Peter; and Ziebach, Helmut, 5,490,540, Cl. 137-625.170.

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Langer, Roland: *See*—
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Langhauser, Franz; Kerth, Jürgen; Schweier, Günther; Brintzinger, Hans-Herbert; Mansel, Stefan; Roell, Werner; and Kirsten, Robin, to BASF Aktiengesellschaft. Preparation of polymers of $C_2$-$C_{10}$-alk-1-enes using racemic metal-locene complexes as catalysts. 5,491,205, Cl. 526-121.000.

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LaPack, Mark A.; Nestrick, Terry J.; Martin, William F.; and Klecka, Gary M., to Dow Chemical Company, The. Self-regulated biological scrubber and/or gas stripper for the treatment of fluid streams. 5,490,933, Cl. 210-603.000.

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Coe, Jotham W.; Fliri, Anton F. J.; Kaneko, Takushi; and Larson, Eric R., 5,491,234, Cl. 544-325.000.

Laser Stealth Technology L.L.C.: *See*—
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Lásko, Josef: *See*—
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Dankman, Scott; and Lastinger, Roc A., 5,491,609, Cl. 361-686.000.

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Chen, Mao-Min; Gutberlet, Mary K.; Krounbi, Mohamad T.; Latimer, Jacqueline K.; and Pinarbasi, Mustafa, 5,491,600, Cl. 360-113.000.

Laugwitz, Bernd: *See*—
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Alfonsi, Jean-Pierre; Galand, Claude; Lebizay, Gerald; and Maurel, Olivier, 5,491,690, Cl. 370-60.000.

Lebkuchner, Benno: *See*—
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LeBlanc, John: *See*—
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Lederman, Joel A.: *See*—
Conti, Walter; Feemster, William R.; Felts, Jeffrey L.; Fields, Antony J.; Henderson, Robert W.; Howard, Paul L.; Kaub, Kevin F.; Lederman, Joel A.; Lee, Thomas M.; Martinez, Gilbert; Mathews, Mark H.; Patel, Ravi V.; Waldrep, Michael W.; and Wetzel, John H., 5,490,455, Cl. 100-50.000.

Ledesma, Andrew C.: *See*—
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Lee, Naisin. Fluid distillation apparatus. 5,490,906, Cl. 202-172.000.

Lee, Nancy E.: *See*—
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Lee, Raymond E.: *See*—
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Lee, Russell P.: *See*—
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Lee, Wilson: *See—*
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Legator, Mona S.: *See—*
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Lehrer, Peggy. Baby bib. 5,490,289, Cl. 2-49.200.

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Lemay, Richard A.: *See—*
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Lemelson, Jerome H. Series of images reproduced from addressable storage. 5,491,591, Cl. 360-35.100.

Leonard Studio Equipment, Inc.: *See—*
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Leone, Anthony J.: *See—*
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Lequesne, Bruno P. B.: *See—*
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Leroux, Bernard: *See—*
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Leung, Martin K.: *See—*
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Leung, Martin S.: *See—*
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Leupold, Ernst I.; Kaufmann, Wolf-Dietmar; Laugwitz, Bernd; Duchatsch, Günther; and Meyer-Blumenroth, Ulrich, to Hoechst Aktiengesellschaft. Process for catalyst recovery. 5,490,936, Cl. 210-636.000.

Leupold, Herbert A., to United States of America, Army. Magic sphere providing distortion-free access to a large internal working space containing a uniform high-intensity magnetic field. 5,491,459, Cl. 335-306.000.

Levai, Jean-Paul: *See—*
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Levin, John M. Extendable gutting knife. 5,490,332, Cl. 30-161.000.

Levine, Jules D.; Shen, Chi-Cheong; and Gnade, Bruce E., to Texas Instruments Incorporated. Flat panel display anode plate having isolation grooves. 5,491,376, Cl. 313-495.000.

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Levran, Alexander; Nowosielski, Joseph M.; Ton-That, Giao M.; Rajagopalan, Ramamoorthy; and Mabboux, Henri, to Square D Company. AC to DC power conversion system. 5,491,624, Cl. 363-87.000.

Lew, Paul E., to Wear and Tear, Inc. Racing wheel. 5,490,719, Cl. 301-5.100.

Lewis, Alan G.: *See—*
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Leyva, Victor: *See—*
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Li, Luyuan: *See—*
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Lim, Chun B.; Kline, Barry D.; Jiang, Jinghua J.; and Rappoport, Vitaliy, to Trionix Research Laboratory, Inc. Apparatus and method for nuclear camera calibration. 5,491,342, Cl. 250-363.090.

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Lin, Arlo H. T. Electric ignition type handy gas torch. 5,490,496, Cl. 126-414.000.

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Lin, Peng-Cheng, to National Semiconductor Corporation. Electronic package for isolated circuits. 5,491,360, Cl. 257-672.000.

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Lin, William C.: *See—*
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Linger, Judith M.: *See—*
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Link, Helmut F., to Index-Werke GmbH & Co. KG Hahn & Tessky. Lathe. 5,490,307, Cl. 29-27.00C.

Litvin, Charles: *See—*
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Lockheed Idaho Technologies Company: *See—*
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Carey, Jay F., II; and Zamanzadeh, Mehrooz, 5,491,035, Cl. 428-647.000.
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Herbstman, Sheldon; Love, Doris; Petrus, Michael P.; and Migdal, Cyril A., 5,490,864, Cl. 44-379.000.
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Casson, Robert D.; and Lovelady, John A., 5,491,227, Cl. 536-124.000.
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Horstmann, Jens; and Kim, Yoon, 5,491,806, Cl. 395-417.000.
Newman, Keith G., 5,490,324, Cl. 29-830.000.
Scepanovic, Ranko; and Ding, Cheng-Liang, 5,491,641, Cl. 364-491.000.
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Smith, Thomas R.; Salomon, Mary F.; Davis, Kirk E.; Karn, Jack L.; and Cahoon, John M., 5,490,945, Cl. 252-18.000.
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Riccobono, Juanita R.; and Ludman, Jacques E., 5,491,569, Cl. 359-3.000.
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Akhavan-Tafti, Hashem; Desilva, Renuka; and Sugioka, Katsuaki, 5,491,072, Cl. 435-28.000.
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Bruns, Robert F., Jr.; Gehlert, Donald R.; Howbert, J. Jeffry; and Lunn, William H. W., 5,491,140, Cl. 514-212.000.
Lunzman, Stephen V., to Caterpillar Inc. Hydraulic flow priority system. 5,490,384, Cl. 60-327.000.
Luo, Wenzhe; and Xu, Jiasheng, to United Microelectronics Corporation. Fast Fourier transform address generator. 5,491,652, Cl. 364-726.000.
Lusted, Hugh S.: *See*—
Knapp, R. Benjamin; Hake, Lisa E.; and Lusted, Hugh S., 5,491,492, Cl. 345-8.000.
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Schietinger, Charles W.; and Adams, Bruce E., 5,490,728, Cl. 374-7.000.
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Fruchtbaum, Joseph; and Kronmiller, Frederick B., 5,490,920, Cl. 210-112.000.
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Van de Geijn, Peter T.; Bealer, Kenneth H.; Earnest, Edward M.; Kuykendall, Kenneth H., Sr.; and Maccherone, Larry S., 5,490,827, Cl. 493-109.000.
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Macia, Narciso F.; and Pyde, Richard A., to Control Systems Innovations, Inc. Filtration system. 5,490,924, Cl. 210-257.100.
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D'Obrenan, Jean V.; Madigou, Nicole; and Deriaud, Thierry, 5,490,869, Cl. 75-10.140.
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Matsumura, Shozo; and Yasutomi, Sueharu, 5,490,439, Cl. 81-469.000.
Maeda, Takeshi; Saito, Atsushi; and Ide, Hiroshi, to Hitachi, Ltd. Method and apparatus for recording/reproducing information data in a two-dimensional format. 5,491,678, Cl. 369-59.000.
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Malmin, Oscar. Dental irrigating and aspiration system. 5,490,779, Cl. 433-81.000.
Malone, Kevin J.; Hayden, Joseph S,; Sanford, Norman A.; and Aust, John A., to United States of America, Commerce. Integrated optic laser. 5,491,708, Cl. 372-41.000.
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Kotzur, Joachim, 5,490,760, Cl. 415-68.000.
Mand, Ranjit S.; Ijichi, Tetsuro; and Xu, Jingming, to Furukawa Electric Co., Ltd., The. Semiconductor laser device. 5,491,711, Cl. 372-49.000.
Mandalia, Baiju D.: *See—*
Davis, Gordon T.; Linger, Judith M.; Mandalia, Baiju D.; Sinibaldi, John C.; Zevin, William M.; and Ziegenhain, Karl-Heinz, 5,491,720, Cl. 375-222.000.
Mangrum, Ronald W.: *See—*
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Müller, Karsten; and Glotzbach, Jörn, 5,490,383, Cl. 60-327.000.
Rub, Winfried; and Biener, Rainer, 5,490,442, Cl. 91-445.000.
Manning, Mark C.: *See—*
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Manning, Monte: *See—*
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Mansel, Stefan: *See—*
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Mantha, Suryanarayana M.: *See—*
Wakayama, Toshiro; Brown, Allen L., Jr.; Mantha, Suryanarayana M.; and Feng, An, 5,491,628, Cl. 364-419.080.
Manthei, Michael A.: *See—*
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Marceau, Justin; and Rademacher, Darrell G., to XCP, Inc. Card metering system. 5,491,326, Cl. 235-381.000.
Marcel, Robert; and Babaz, Michel. Automatic rain water collection device on downpipe. 5,490,538, Cl. 137-357.000.
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Marchell, Ted. Sand-blast sign-making apparatus. 5,490,807, Cl. 451-3.000.
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Mark, Edward F.: *See—*
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Mark Sims, S.F.E.: *See—*
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Marker, Terry L.: *See—*
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Marko, Paul D.: *See—*
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Markström, Håkan, to AB Lorentzen & Wettre. Process and a device for measuring static and dynamic friction of sheet-shaped materials. 5,490,410, Cl. 73-9.000.
Markyvech, Ronald K.: *See—*
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Marley Pump Company, The: *See—*
Broline, Russell L., 5,490,544, Cl. 141-1.000.
Maro, Hideharu; Kodaira, Hideki; Iwase, Hiroshi; and Komiya, Yuji, to Toppan Printing Co., Ltd. Laminated packaging material. 5,491,018, Cl. 428-200.000.
Marques, Marco E.; and Brun, Roberto D., to Multibrás S/A Eletrodomésticos. Fan control system for the evaporator of refrigerating appliances. 5,490,394, Cl. 62-186.000.
Marsh, Ogden J.: *See—*
Williams, Ronald L.; Marsh, Ogden J.; and Shields, Steven E., 5,491,571, Cl. 359-59.000.
Marshall, Richard L., to United Technologies Corporation. Method for performing combustion. 5,490,380, Cl. 60-39.060.
Martin, Carl A.: *See—*
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Martin, Karl-Heinz, to Kreuzer GmbH + Co. OHG. Overhead support. 5,490,652, Cl. 248-282.100.
Martin Marietta Corporation: *See—*
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Martin, Patricia A.: *See—*
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Martin, Patrick H.; Bales, Stephen E.; Kim, Peter K.; and Wessling, Ritchie A., to Dow Chemical Company, The. Low heat release polymeric composites. 5,490,967, Cl. 264-322.000.
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Martin, Russel A.: *See—*
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Martin, William F: *See—*
LaPack, Mark A.; Nestrick, Terry J.; Martin, William F.; and Klecka, Gary M., 5,490,933, Cl. 210-603.000.
Martinez, Gilbert: *See—*
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Maruyama, Takashi: *See—*
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Maruyama, Takesuke: *See—*
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Mase, Tomokazu; Murata, Yoshiyuki; Ariizumi, Masahito; and Sato, Shinichiro, to Casio Computer Co., Ltd. Image data processor. 5,491,777, Cl. 395-133.000.
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Masimo Corporation: *See—*
Diab, Mohamed K.; Kiani-Azarbayjany, Esmaiel; and Weber, Walter M., 5,490,505, Cl. 128-633.000.
Mason, James P., to Bayer Corporation. Thermally stable, gamma radiation-resistant blend of polycarbonate with polyester. 5,491,179, Cl. 523-136.000.
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Buchwald, Stephen L.; Broene, Richard D.; and Lee, Nancy E., 5,491,233, Cl. 544-174.000.
Cima, Linda G.; and Cima, Michael J., 5,490,962, Cl. 264-22.000.
Herrmann, Frederick P.; and Sodini, Charles G., 5,491,803, Cl. 395-287.000.
Sachs, Emanuel M.; Cima, Michael J.; Bredt, James F.; and Khanuja, Satbir, 5,490,882, Cl. 134-1.000.
Massie, Johnny D., II; Hobart, Paul W.; and Malin, Jerry, to Goodyear Tire & Rubber Company, The. Cut resistant tire. 5,490,550, Cl. 152-193.000.
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Mathur, Arvind: *See—*
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Matoba, Tatsuo; and Yorimitsu, Keiichi, to Fujitsu Limited. Input/ouput controller providing preventive maintenance information regarding a spare I/O unit. 5,491,816, Cl. 395-181.000.

Matsubara, Yoshihiro: *See—*
Miyata, Shigeru; Yamada, Yoshitaka; Yoshida, Hideji; Matsubara, Yoshihiro; and Ito, Yasuo, 5,491,417, Cl. 324-402.000.

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Matsui, Fumio; Uotani, Nobuo; Murakami, Masatoshi; and Itoh, Yuji, to Showa Denko K. K. Polyorganosiloxane and process for producing the same. 5,491,203, Cl. 525-474.000.

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Matsumoto, Kunio: *See—*
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Matsumoto, Naoko: *See—*
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Matsumoto, Shinya, to Olympus Optical Co., Ltd. Light source devices for endoscopes. 5,491,765, Cl. 385-33.000.

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Matsushita Electric Industrial Company, Ltd.: *See—*
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Matsushita Electric Industrial Co., Ltd.: *See—*
Akahira, Nobuo, 5,491,003, Cl. 427-255.300.
Fukuda, Hideki; Honjo, Masahiro; and Shibata, Hideaki, 5,491,514, Cl. 348-397.000.
Fukuda, Hideki, 5,491,561, Cl. 358-342.000.
Gamo, Takaharu; Moriwaki, Yoshio; Iwaki, Tsutomu; and Shintani, Akemi, 5,490,970, Cl. 420-424.000.
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Morita, Yoshio, 5,490,953, Cl. 252-518.000.
Okada, Tsuyoshi; Kobayashi, Toshiaki; and Ozawa, Hidetaka, 5,491,446, Cl. 327-551.000.
Sato, Akihiro, 5,491,523, Cl. 348-699.000.
Shoji, Rihito; and Saitou, Shinji, 5,490,424, Cl. 73-728.000.
Terashima, Yuji; Haruguchi, Takashi; Ohwaki, Hirohiko; and Soeda, Yoshinobu, 5,491,684, Cl. 369-219.000.
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Eriguchi, Hiroyasu; Nishimura, Hiroshi; Yamamoto, Minoru; Iwahori, Yutaka; and Kamoi, Takeshi, 5,491,386, Cl. 315-209.00R.
Ueda, Yasunori; and Otsuka, Kiyotaka, 5,490,328, Cl. 30-43.920.

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Matsushita, Osami: *See—*
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Matsuzawa, Tosio: *See—*
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Mattera, Mario: *See—*
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Matz, John E., to Motorola, Inc. Method and apparatus for reducing distortion in an output signal of an amplifier. 5,491,454, Cl. 330-149.000.

Maule, Colin H.: *See—*
Stewart, Douglas A.; Maule, Colin H.; and Molloy, James O., 5,491,556, Cl. 356-445.000.

Maurath, Steven E.: *See—*
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Maurel, Olivier: *See—*
Alfonsi, Jean-Pierre; Galand, Claude; Lebizay, Gerald; and Maurel, Olivier, 5,491,690, Cl. 370-60.000.

Maxson, William R.; Heiniger, Jerry D.; and Rustman, James C., to Kearney-National, Inc. Wheel bearing speed sensor. 5,491,407, Cl. 324-174.000.

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May, Gregory J.: *See—*
Robson, Christopher J.; and May, Gregory J., 5,491,785, Cl. 395-162.000.

May, Michael D.; Edwards, Jonathan; and Waller, David L., to INMOS Limited. Microcomputer with high density ram in separate isolation well on single chip. 5,491,359, Cl. 257-373.000.

Mayer, Joseph B., Jr.: *See—*
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Mayer, Matthias: *See—*
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Mayer, Ulrich; Kaltenbrunn, Peter; Hoeptner, Wolfgang; and Mischker, Karsten, to Robert Bosch GmbH. Ignition system for an internal combustion engine. 5,490,489, Cl. 123-630.000.

Maynard, Raymond W.: *See—*
Wise, Gordon A.; Saunders, Roger N.; Thomas, Matthew M.; Maynard, Raymond W.; and Mangrum, Ronald W., 5,490,401, Cl. 68-198.000.

Mazaki, Hitoshi; Toyooka, Takehiro; and Itoh, Hiroyuki, to Nippon Oil Company, Limited. Method for producing viewing angle compensator for liquid crystal display. 5,491,001, Cl. 427-162.000.

Mazur, Edward J.: *See—*
Setcavage, Thomas M.; Reis, Kathleen J.; Davies, Donald M.; and Mazur, Edward J., 5,491,067, Cl. 435-7.250.

Mazzochette, Joseph B., to EMC Technology, Inc. Surface mount terminal for electrical component. 5,490,788, Cl. 439-83.000.

McBain, Douglas S.; Melby, Earl G.; and LaJudice, Kevin P., to GenCorp. Inc. Unsaturated polyester-modified flexible copolymers for use in sheet molding compositions. 5,491,184, Cl. 523-436.000.

McCabe, Gregory M.: *See—*
Villagran, Francisco V.; McCabe, Gregory M.; and Wong, Vincent Y.-L., 5,490,999, Cl. 426-633.000.

McCaig, M. Scott: *See—*
Shalaby, Shalaby W.; and McCaig, M. Scott, 5,491,198, Cl. 525-340.000.

McCallum, Theresa M.: *See—*
Picone, Teresa K. H.; McCallum, Theresa M.; and Zoccoli, Michael A., 5,491,225, Cl. 536-24.320.

McCandlish, Larry E.: *See—*
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Kasat, Radhakrishna B.; Lee, Wilson; McCarthy, David R.; and Telyan, Norayr G., 5,490,979, Cl. 424-66.000.

McCaul, Bruce W.; Doggett, David E.; and Thorson, Eric K., to McCaul, Bruce W. Gas spectroscopy. 5,491,341, Cl. 250-343.000.

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McClure, David C., to SGS-THOMSON Microelectronics, Inc. Fuse circuit with feedback disconnect. 5,491,444, Cl. 327-525.000.

McConnell, Michael P., to Talus Corporation. Utility bag. 5,490,623, Cl. 224-275.000.

McCormick, Fred B.: *See—*
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McCune, Earl W., Jr.; and Venugopal, Narendar. Apparatus for spreading the spectrum of a signal and method therefor. 5,491,458, Cl. 332-144.000.

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McDonnell Douglas Corporation: *See—*
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Bakhshi, Shiv K.; Williams, Steven H.; Scott, James W.; Haines, Randall M.; and McGrath, Ralph D., 5,490,961, Cl. 264-6.000.

McGreen, James R. Electric propulsion system for a bicycle. 5,491,390, Cl. 318-5.000.

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McKenzie, Douglas T.; and Sorge, Joseph A., to Stratagene. Polynucleotide amplification mycoplasma assay, primers, and kits therefore. 5,491,062, Cl. 435-6.000.

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Thiele, Charles W.; Willemstyn, Tunis J.; Arndt, Douglas J.; and McMullen, John J., 5,490,745, Cl. 406-132.000.

McMullen, Steven R.: *See*—
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McNeil, Ronald A. Method and apparatus for inflating and curing a resin impregnated manhole liner. 5,490,744, Cl. 405-303.000.

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Meagher, John L.; Rothrauff, Charles E.; and Alexander, Trey, to Digital Access Corporation. Means and method of dial up bridging of network for high bandwidth digital communication. 5,491,695, Cl. 370-112.000.

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Eigendorf, Hans-Günter, 5,490,925, Cl. 210-321.690.

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Medtronic, Inc.: *See*—
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Meiller, Hermann; Mayer, Matthias; and Hoerner, Josef, to Grammer AG. Seat, in particular a vehicle seat. 5,490,657, Cl. 248-588.000.

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Melby, Earl G.: *See*—
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Melcher, Laura: *See*—
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Méndez, Deborah: *See*—
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Mennen Company, The: *See*—
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Merck & Co., Inc.: *See*—
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Chartrain, Michel M.; Chen, Shieh-Shung T.; Garrity, George M.; Heimbuch, Brian; Roberge, Christopher; and Shafiee, Ali, 5,491,077, Cl. 435-118.000.
deSolms, S. Jane; and Graham, Samuel J., 5,491,164, Cl. 514-423.000.

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Methode Electronics, Inc.: *See*—
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Mickel, Thomas J.; and Willason, Stewart W., to Mednext Inc. Tool shaft coupler. 5,490,683, Cl. 279-75.000.

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Microtek Industries, Inc.: *See*—
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Middle, George H.; Evans, Edward A.; and Purdy, Craig, to Sofamor Danek Properties, Inc. Portable power cutting tool. 5,490,860, Cl. 606-171.000.

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Migrin, Robert S.: *See*—
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Mihm, Joseph J., to TRW Vehicle Safety Systems Inc. Vehicle safety apparatus including inflatable restraint. 5,490,690, Cl. 280-728.200.

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Miller, Richard D.: *See*—
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Miller, William R.; Becker, Timothy J.; and Olson, John E., to Tidland Corporation. Torque-actuated expansible shaft assembly for roll core. 5,490,640, Cl. 242-571.600.
Miller, William S.; and Grimes, Roger, to Alcan International Limited. Metal treatment. 5,490,885, Cl. 148-564.000.
Millsapps, Stuart C., Jr., to Briscoe Tool Company. Earth boring bit and lubricator/compensator therefor. 5,490,570, Cl. 175-228.000.
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Reeves, Mark E.; Hartfel, Margaret A.; Rouser, Forrest J.; Smith, Kenneth L.; and Benson, Olester, Jr., 5,491,015, Cl. 428-167.000.
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Watanabe, Seigo; and Ohkita, Motomu, 5,491,258, Cl. 562-538.000.
Mitsui, Tadashi; Harada, Nozomu; Miyoshi, Motosuke; Sekine, Makoto; Okumura, Katsuya; and Okano, Haruo, to Kabushiki Kaisha Toshiba. Charged particle detection device and charged particle radiation apparatus. 5,491,339, Cl. 250-310.000.
Miyabe, Kanji; Orita, Nobuhiro; Iwasaki, Makoto; Tsurumaru, Yohka; and Nakahara, Toshitsugu, to Kurita Water Industries, Ltd. Method of treatment of a fluid containing volatile organic halogenated compounds. 5,490,941, Cl. 210-673.000.
Miyake, Akio; Kawano, Yasuhiko; and Ashida, Yasuko, to Takeda Chemical Industries, Ltd. Imidazopyridazines, their production and use. 5,491,145, Cl. 514-248.000.
Miyakoshi, Hideo: *See*—
Aoki, Tadao; and Miyakoshi, Hideo, 5,491,150, Cl. 514-310.000.
Miyama, Hiroshi; Ohki, Tetsuhiko; Kaji, Hitoshi; Yusa, Yoshiyuki; and Hirose, Yasuo, to Chiyoda Corporation. Industrial furnace provided with rotary regenerative burner. 5,490,776, Cl. 431-215.000.
Miyamoto, Kyoko; and Noro, Fumihiko, to Matsushita Electronics Company. Manufacturing method of non-volatile semiconductor memory devices. 5,491,101, Cl. 437-43.000.
Miyanaga, Yoshinobu; and Mishima, Kenji, to Sumitomo Rubber Industries, Ltd. Tire former capable of expanding and contracting in an axial direction. 5,490,897, Cl. 156-415.000.
Miyasaka, Toshifumi: *See*—
Nakamura, Toshio; Soeda, Yoshimi; Miyasaka, Toshifumi; and Iwata, Minoru, 5,490,319, Cl. 29-596.000.
Miyasato, Philip G.: *See*—
Alsborg, Roger C.; DeArmas, Jose I.; Hanson, Scott L.; Higgins, William B.; Miyasato, Philip G.; and Nayak, Ashok B., 5,491,595, Cl. 360-75.000.
Miyata, Haruyuki, to Kabushiki Kaisha Toshiba. Semiconductor device having an isolating portion between two circuit regions. 5,491,358, Cl. 257-546.000.
Miyata, Koichi: *See*—
Koyamao, Hisasi; Miyata, Koichi; Saito, Kimitsugu; Dreifus, David L.; and Stoner, Brian R., 5,491,348, Cl. 257-66.000.
Miyata, Shigeru; Yamada, Yoshitaka; Yoshida, Hideji; Matsubara, Yoshihiro; and Ito, Yasuo, to NGK Spark Plug Co., Ltd. Sparkplug voltage probe device having a capacitance compensating function for an internal combustion engine. 5,491,417, Cl. 324-402.000.
Miyauchi, Yasunori: *See*—
Morikawa, Shuichi; Futatsuka, Masahiko; Ishida, Satoshi; Miyauchi, Yasunori; Masuda, Minoru; and Takagawa, Makoto, 5,491,567, Cl. 358-498.000.
Miyazaki, Yoshiaki; and Mizumura, Kazuo, to Dow Chemical Company, The; and Dow Mitsubishi Kasei Ltd. Polyurethane foam molding. 5,491,175, Cl. 521-137.000.
Miyazaki, Yukio; Okitaka, Takenori; Hatakenaka, Makoto; and Mano, Junji, to Mitsubishi Denki Kabushiki Kaisha. Synchronized clock generating apparatus. 5,491,438, Cl. 327-144.000.
Miyoshi, Motosuke: *See*—
Mitsui, Tadashi; Harada, Nozomu; Miyoshi, Motosuke; Sekine, Makoto; Okumura, Katsuya; and Okano, Haruo, 5,491,339, Cl. 250-310.000.
Mizoguchi, Kazuaki: *See*—
Ikeda, Naoki; Yoshimura, Masafumi; Mizoguchi, Kazuaki; and Kimura, Yoshiharu, 5,491,188, Cl. 524-229.000.
Mizuide, Masuya: *See*—
Kyushima, Hiroyuki; Nagura, Koji; Hasegawa, Yutaka; Kawano, Eiichiro; Kuroyanagi, Tomihiko; Atsumi, Akira; and Mizuide, Masuya, 5,491,380, Cl. 313-533.000.
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MM Systems of Arizona: *See*—
Kemeny, Zoltan A., 5,490,356, Cl. 52-167.700.
Moaddeb, Shahram: *See*—
Thacker, James R.; Weinberg, Alvin H.; and Moaddeb, Shahram, 5,490,323, Cl. 29-625.000.
Mobil Oil Corporation: *See*—
Baillargeon, David J.; Cardis, Angeline B.; and Heck, Dale B., 5,490,863, Cl. 44-331.000.

Chin, Arthur A.; Collins, Nick A.; Harandi, Mohsen N.; Thomson, Robert T.; and Ware, Robert A., 5,491,270, Cl. 585-467.000.
Santiesteban, Jose G.; Chang, Clarence D.; Vartuli, James C.; and Olson, David H., 5,491,273, Cl. 585-639.000.
Tsai, Mingliang L.; and Balloni, Riccardo, 5,491,023, Cl. 428-349.000.

Mobley, Larry W.: *See*—
Grier, Laura A.; Neill, Paul L.; Priester, Ralph D.; Mobley, Larry W.; Skaggs, Kenneth W.; and Turner, Robert B., 5,491,174, Cl. 521-126.000.

Moeller, Martin L.: *See*—
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Mohwinkel, Clifford A.: *See*—
Johnson, Edwin F.; Lockie, Douglas G.; and Mohwinkel, Clifford A., 5,491,449, Cl. 330-269.000.

Mok, Lawrence S.-W.; Purushothaman, Sampath; Sammakia, Bahgat G.; Wilczynski, Janusz S.; and Wu, Tien Y., to International Business Machines Corporation. Electronic package having active means to maintain its operating temperature constant. 5,491,610, Cl. 361-695.000.

Mokoski, Christopher D.: *See*—
Ward, Jean R.; Barrett, David M.; Martin, Patricia A.; and Mokoski, Christopher D., 5,491,495, Cl. 345-173.000.

Molenaar, Gregory A.: *See*—
Wernberg, Donald E.; Molenaar, Gregory A.; and Miller, Daniel F., 5,490,379, Cl. 60-39.281.

Molex Incorporated: *See*—
Benes, Kevin C.; Colleran, Stephen A.; Gugelmeyer, Robert J.; and Premo, Thomas G., 5,490,800, Cl. 439-567.000.

Molin, Anders K.: *See*—
Sellin, Patrik C.; Fall, Örjan P. S.; Molin, Anders K.; and Wilhelmsson, Lars J., 5,491,719, Cl. 375-213.000.

Moller, Christian H. L., to International Business Machines Corporation. Method and apparatus for variable minification of an image. 5,491,769, Cl. 395-139.000.

Moller, David D.; and Archibald, James B., to Delco Electronics Corporation. Booster power converter having accelerated transient boost response. 5,491,445, Cl. 327-540.000.

Mollet, Beat: *See*—
Knol, Jan; Marciset, Olivier; and Mollet, Beat, 5,491,079, Cl. 435-172.300.

Molloy, James O.: *See*—
Stewart, Douglas A.; Maule, Colin H.; and Molloy, James O., 5,491,556, Cl. 356-445.000.

Molnar, Charles J.; and Molnar, Judith R., to Molnar, Charles J.; and Molnar, Judith R. Low cost sod mat and method for propagation. 5,490,351, Cl. 47-56.000.

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Molnar, Charles J.; and Molnar, Judith R., 5,490,351, Cl. 47-56.000.

Molock, Frank F.: *See*—
Nuñez, Ivan M.; Molock, Frank F.; Elliott, Laura D.; and Ford, James D., 5,490,960, Cl. 264-2.600.
Nuñez, Ivan M.; Molock, Frank F.; Elliott, Laura D.; and Ford, James D., 5,490,959, Cl. 264-2.600.

Molten Metal Technology, Inc.: *See*—
Robert, Edgar J.; Howie, F. James, III; Nagel, Christopher J.; and Griffin, Thomas P., 5,491,279, Cl. 588-201.000.

Monger Mounts, Inc.: *See*—
Bates, Nigel P., 5,490,655, Cl. 248-329.000.

Monn, James A., to Eli Lilly and Company. Bicyclic intermediates for excitatory amino acid receptor antagonists. 5,491,241, Cl. 548-452.000.

Monosov, Ann; and Fu, Xinyu, to Anticancer Incorporated. Nude mouse model for neoplastic disease. 5,491,284, Cl. 800-2.000.

Monsanto Company: *See*—
Backes, Thomas W.; Dingman, Sean D.; and Verrett, Sheldon P., 5,490,949, Cl. 252-174.000.
Kuczynski, Krzysztof, 5,490,942, Cl. 210-700.000.

Mooney, Robert: *See*—
Blanchard, Clarence E.; Rogers, Duane E.; Hall, Charles B.; Mooney, Robert; Craig, W. Scott; and Bergman, Dean P., 5,490,804, Cl. 440-38.000.

Moore, Steven L.: *See*—
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Mora, Leonard L.: *See*—
Hamzehdoost, Ahmad; and Mora, Leonard L., 5,491,362, Cl. 257-712.000.

Morgan Crucible Company plc, The: *See*—
Cooper, David L.; Dunigan, Robert C.; Grenier, Joseph M.; and Lee, Eric G., 5,491,373, Cl. 310-235.000.

Morgan, Denny E.: *See*—
Bitar, Ali A.; Bowman, Charles W.; and Morgan, Denny E., 5,491,422, Cl. 324-636.000.

Mori, Fumiko; and Matsushima, Haruo, to Matsushita Electric Industrial Co., Ltd. High frequency heating apparatus for heating a material and a method of heating a material by high frequency irradiation. 5,491,323, Cl. 219-710.000.

Mori, Takayoshi: *See*—
Nishimura, Ken-ichi; Yoshimi, Akihisa; Mori, Takayoshi; Kakeya, Nobuharu; Kikuchi, Masahiro; Kondoh, Nobuo; Uchida, Takeshi; and Yamanouchi, Koichi, 5,491,171, Cl. 514-558.000.

Mori, Toshihiro: *See*—
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Morice, Larry F.: *See*—
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Morikawa, Shuichi; Futatsuka, Masahiko; Ishida, Satoshi; Miyauchi, Yasunori; Masuda, Minoru; and Takagawa, Makoto, to PFU Limited; and Fujitsu Limited. Image reading apparatus. 5,491,567, Cl. 358-498.000.

Morinaga, Yoshiki: *See*—
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Morishita, Takeshi: *See*—
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Morita, Yoshio, to Matsushita Electric Industrial Co., Ltd. Semiconductor compound. 5,490,953, Cl. 252-518.000.

Moritz, C. J., to Vaw Aluminium AG. Teeming arrangement for aluminum continuous casting apparatus. 5,490,554, Cl. 164-437.000.

Moriwaki, Yoshio: *See*—
Gamo, Takaharu; Moriwaki, Yoshio; Iwaki, Tsutomu; and Shintani, Akemi, 5,490,970, Cl. 420-424.000.

Moriya, Mitsuro: *See*—
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Morris, Richard. Portable cooling container. 5,490,396, Cl. 62-457.200.

Morrison, Clark, to Actex. Method for making embossed laminated foam articles. 5,490,890, Cl. 156-66.000.

Morrison, Larry E.: *See*—
Bittner, Michael L.; Morrison, Larry E.; and Legator, Mona S., 5,491,224, Cl. 536-22.100.

Mortara, David W., to Mortara Instrument, Inc. Filter apparatus and method for reducing signal noise using a plurality of signals obtained from a signal source. 5,490,515, Cl. 128-696.000.

Mortara Instrument, Inc.: *See*—
Mortara, David W., 5,490,515, Cl. 128-696.000.

Mörtel, Hans G.: *See*—
Hohmann, Friedrich; Röll, Werner; and Mörtel, Hans G., 5,490,974, Cl. 422-197.000.

Morton, Howard E.: *See*—
Stuk, Timothy L.; Allen, Michael S.; Haight, Anthony R.; Kerdesky, Francis A.; Langridge, Denton C.; Leanna, M. Robert; Lijewski, Linda M.; Melcher, Laura; Morton, Howard E.; Norbeck, Daniel W.; Reno, Daniel S.; Robbins, Timothy A.; Scarpetti, David; Sham, Hing L.; Sowin, Thomas J.; Tien, Jien-Heh J.; and Zhao, Chen, 5,491,253, Cl. 560-27.000.

Morton International, Inc.: *See*—
Friswell, Michael R.; Hallisy, Michael J.; and Hinton, Michael P., 5,490,872, Cl. 44-328.000.
Garner, Brett R.; and Lee, Russell P., 5,490,689, Cl. 280-728.200.

Moses, Paul J.: *See*—
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Mosley, Ellen: *See*—
Kaiser, H. Paul; Mosley, Ellen; Baer, Samuel C.; and Bononcini, Kenneth, 5,491,016, Cl. 428-198.000.

Mosquera, Rene A.; and Zahlit, Wayne A., to ITT Corporation. Termination of contact tails to PC board. 5,490,786, Cl. 439-79.000.

Möstl, Franz: *See*—
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Motan, Inc.: *See*—
Thiele, Charles W.; Willemstyn, Tunis J.; Arndt, Douglas J.; and McMullen, John J., 5,490,745, Cl. 406-132.000.

Motomura, Masato, to NEC Corporation. Semiconductor static random access memory device having previously equalizable memory cells. 5,491,661, Cl. 365-230.010.

Motorola: *See*—
Lebby, Michael S.; and Jachimowicz, Karen E., 5,491,491, Cl. 345-7.000.
Williams, Gregory L.; and Roman, William C., 5,491,831, Cl. 455-33.100.

Motorola, Inc.: *See*—
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Hall, Scott M., 5,491,717, Cl. 375-205.000.
Harnishfeger, David B.; and Pennell, Michael J., 5,491,434, Cl. 327-50.000.
Matz, John E., 5,491,454, Cl. 330-149.000.
Neiss, David A., 5,491,836, Cl. 455-38.500.
Sasuta, Michael D.; and Wolfe, John A., 5,491,835, Cl. 455-34.100.
Schwendeman, Robert J., 5,491,469, Cl. 340-825.040.
Shtayer, Ronen; Alon, Naveh; and Alexander, Joffe, 5,491,691, Cl. 370-61.000.
Wadin, Craig P.; and Marko, Paul D., 5,491,739, Cl. 379-57.000.
Weiss, Michael L., 5,491,303, Cl. 174-262.000.
de la Luz, Juan B.; Dzung, John C.; Hernandez, Orlando; and Beasley, Jeff R., 5,491,478, Cl. 341-22.000.

Motoyoshi, Masatoshi: *See*—
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Mountian Hardwear, Inc.: *See*—

Kramer, Paul F., 5,490,294, Cl. 5-413.000.
MTS Systems Corporation: *See*—
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MTU Motoren- und Turbinen-Union Muenchen GmbH: *See*—
Berger, Johann; and Simon, Burkhard, 5,490,378, Cl. 60-39.230.
Mudge, Elbert H.; and Brabson, Thomas D., to Henkel Corporation. Process for applying a low soiling fiber finish. 5,491,004, Cl. 427-393.400.
Mudge, Elbert H.; and DeWitt, Charles G., to Henkel Corporation. Process for treating fibers with an antistatic finish. 5,491,026, Cl. 428-395.000.
Mueller, Karl F.: *See*—
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Müller, Karsten; and Glotzbach, Jörn, to Mannesmann Rexroth GmbH. Method of pressure controlling a hydrostatic machine having an adjustable delivery volume. 5,490,383, Cl. 60-327.000.
Muller, Robert D.: *See*—
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Multibrás S/A Eletrodomésticos: *See*—
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Mun, Zin-Suk; and Bae, Myung-Ho, to Samsung Electronics Co., Ltd. Data sensing circuit with additional capacitors for eliminating parasitic capacitance difference between sensing control nodes of sense amplifier. 5,491,435, Cl. 327-55.000.
Muncy, Robert G. Root grubber. 5,490,340, Cl. 37-301.000.
Munson, Janet F.: *See*—
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Murai, Hiroyuki: *See*—
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Murakami, Keiichi: *See*—
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Murakami, Makoto; Noro, Michimasa; and Ito, Takao, to Sumitomo Wiring Systems, Ltd. Connector examining device. 5,490,798, Cl. 439-310.000.
Murakami, Masatoshi: *See*—
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Muramatsu, Hideo: *See*—
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Muramatsu, Scott. Insect trap with liquid attractant. 5,490,349, Cl. 43-122.000.
Murao, Yukinobu: *See*—
Suzuki, Mieko; Homma, Tetsuya; Murao, Yukinobu; Tanigawa, Takaho; and Koga, Hiroki, 5,491,108, Cl. 437-192.000.
Murase, Michio: *See*—
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Murata Manufacturing Co., Ltd.: *See*—
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Murata, Yoshiyuki: *See*—
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Murota, Masayuki, to Kabushiki Kaisha Toshiba. Method of manufacturing semiconductor device having a planarized surface. 5,491,113, Cl. 437-225.000.
Murphy, William S.: *See*—
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Murray, Steven C.: *See*—
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Muscat, Orlando F.; Muller, Robert D.; and Feldman, Mark, to United Technologies Automotive, Inc. Multifunction switch. 5,491,311, Cl. 200-4.000.
Mustain, Richard G.: *See*—
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Mustalahti, Jorma: *See*—
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Myatt, Patricia A. Paper towel and toilet paper portable dispenser. 5,490,625, Cl. 225-47.000.
Myers, W. Neill; Shadoan, Michael D.; Forbes, John C.; Baker, Kevin J.; and Rice, Darron C., to United States of America, National Aeronautics and Space Administration. Selectively lockable knee brace. 5,490,831, Cl. 602-26.000.
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Nagao, Rex: *See*—
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Nagasawa, Hiroshi: *See*—
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Nagashima, Teruo; Oba, Satoshi; Ishizuka, Tomomi; and Masuda, Hiroyuki, to Minolta Co., Ltd. Sheet transportation apparatus carrying out error determination considering switching of sheet transportation path. 5,490,667, Cl. 271-225.000.
Nagashima, Toshiaki; Kitayama, Kunihiko; and Oyama, Kiyoshi, to Canon Kabushiki Kaisha. Developer supplying container and assembling method thereof. 5,491,542, Cl. 355-260.000.
Nagata, Kenzo: *See*—
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Nagata, Masaya: *See*—
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Nagel, Christopher J.: *See*—
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Nagura, Koji: *See*—
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Nakagawa, Yoshinori; Kimoto, Tetsuo; and Takeuchi, Makoto, to Kabushiki Kaisha Hayashibara Seibutsu Kagaku Kenkyujo. Antitumor treatment method. 5,491,151, Cl. 514-311.000.
Nakahara, Naoji: *See*—
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Nakahara, Toshitsugu: *See*—
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Nakai, Shigeo: *See*—
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Nakajima, Akio; Nakatani, Munehiro; and Muramatsu, Hideo, to Minolta Camera Kabushiki Kaisha. Image forming apparatus having a memory and two operating modes, and method of using same. 5,491,557, Cl. 358-296.000.
Nakajima, Yoshinori, to Fuji Jukogyo Kabushiki Kaisha. Method of determining air density for intake air of automobile engine. 5,490,417, Cl. 73-118.200.
Nakamura, Ryuichi; and Nakano, Kazunori, to Yamaichi Electronics Co., Ltd. IC socket equipped with dust discharge means. 5,490,796, Cl. 439-266.000.
Nakamura, Takehiko: *See*—
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Nakamura, Toshio; Soeda, Yoshimi; Miyasaka, Toshifumi; and Iwata, Minoru, to Ebara Corporation. Thermotropic liquid crystal polymer composition and insulator. 5,490,319, Cl. 29-596.000.
Nakano, Kazunori: *See*—
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Nakata, Yasuo: *See*—
Ishiizumi, Seiichi; Nakata, Yasuo; Hirata, Kazuo; and Nakashima, Akinori, 5,490,574, Cl. 180-68.100.
Nakatani, Hideaki: *See*—
Akita, Hideki; Ota, Makoto; Nakatani, Hideaki; Hatano, Kazuyoshi; and Ogasawara, Manabu, 5,490,730, Cl. 384-147.000.
Nakatani, Munehiro: *See*—
Nakajima, Akio; Nakatani, Munehiro; and Muramatsu, Hideo, 5,491,557, Cl. 358-296.000.
Nakayama, Hidenori: *See*—
Whitlock, Michael B.; Bair, James A.; and Nakayama, Hidenori, 5,490,868, Cl. 55-503.000.
Nakayama, Hideo: *See*—
Seko, Yasuji; Otoma, Hiromi; Ueki, Nobuaki; Fukunaga, Hideki; Nakayama, Hideo; Ueyanagi, Kiichi; and Shiraki, Yasuhiro, 5,491,709, Cl. 372-45.000.

Nalco Chemical Company: *See*—
Jansma, Roger H.; Begala, A. James; and Furman, Gary S., 5,490,904, Cl. 162-168.200.

Nam, In-ho: *See*—
Ahn, Tae-hyuk; Nam, In-ho; and Yoon, Joo-young, 5,491,103, Cl. 437-52.000.

Naokawa, Toyojiro; and Fujii, Katsushige, to National Semiconductor Corporation. Class AB output stage with improved frequency stability. 5,491,448, Cl. 330-264.000.

Naper, Hans P., to Telefonaktiebolaget LM Ericsson. System and method for varying the transmission rate of facsimile data in a telecommunication system. 5,491,565, Cl. 358-468.000.

Napier, James C.; and Thompson, Robert G., to Sundstrand Corporation. Turbine inlet silencer. 5,491,308, Cl. 181-224.000.

Narayan, Ramani: *See*—
Jain, Mahendra K.; Narayan, Ramani; and Han, Ohantaek, 5,490,634, Cl. 241-1.000.

Narayan, Sriram: *See*—
Klein, Hans W.; and Narayan, Sriram, 5,491,681, Cl. 369-124.000.

Narayan, Thirumurti; Lovell, David J.; and Lopez, Carlos H., to BASF Corporation. Polyisocyanate compositions for the preparation of flexible polyurethane foams. 5,491,252, Cl. 560-26.000.

Nasserbakht, Mitra, to Texas Instruments Incorporated. Logic module core cell for gate arrays. 5,491,431, Cl. 326-38.000.

Nasu, Rikuo; Hamaguchi, Motohiko; and Ariyoshi, Hayato, to Ishihara Sangyo Kaisha Ltd. Method for halogenating an aromatic compound. 5,491,239, Cl. 546-345.000.

Nathan, Krishna S.: *See*—
Bellegarda, Jerome R.; Nahamoo, David; and Nathan, Krishna S., 5,491,758, Cl. 382-187.000.

National Semiconductor Corporation: *See*—
Droutsas, Christos F., 5,490,639, Cl. 242-525.100.
Intrater, Gideon; Oz, Oved; and Afek, Yachin, 5,491,828, Cl. 395-800.000.
Kuo, James R., 5,491,455, Cl. 330-253.000.
Lin, Peng-Cheng, 5,491,360, Cl. 257-672.000.
Miller, Roger L.; and Harper, Thomas P., 5,491,634, Cl. 364-426.020.
Naokawa, Toyojiro; and Fujii, Katsushige, 5,491,448, Cl. 330-264.000.

National Starch and Chemical Investment Holding Corporation: *See*—
Key, Charles R.; and Shih, Yen-Jer, 5,491,182, Cl. 523-206.000.

Nau, Guenther: *See*—
Brust, Stefan; Friesen, Heinz-Juergen; Nau, Guenther; and Pauly, Hans-Erwin, 5,491,218, Cl. 530-387.300.

Naughton, Michael L. Surgeon's chair. 5,490,716, Cl. 297-423.120.

Nayak, Ashok B.: *See*—
Alsborg, Roger C.; DeArmas, Jose I.; Hanson, Scott L.; Higgins, William B.; Miyasato, Philip G.; and Nayak, Ashok B., 5,491,595, Cl. 360-75.000.

Naylor, Thomas K.; Crouse, Helen C.; and Muz, Edwin, to Siemens Medical Systems, Inc. Flexible multi-parameter cable. 5,491,299, Cl. 174-36.000.

NCR Corporation: *See*—
Diepstraten, Wilhelmus J. M., 5,491,723, Cl. 375-267.000.

Neal, Michael A.: *See*—
Sargeant, Matthew G.; and Neal, Michael A., 5,491,463, Cl. 340-310.010.

NEC Corporation: *See*—
Azuma, Mituhiro, 5,491,654, Cl. 365-156.000.
Fujita, Masayuki, 5,491,582, Cl. 359-341.000.
Hamabe, Kojiro, 5,491,833, Cl. 455-33.100.
Hongu, Takahiro, 5,491,564, Cl. 358-429.000.
Ichihara, Masaki, 5,491,453, Cl. 327-553.000.
Kitahara, Shinichi, 5,491,674, Cl. 369-32.000.
Kobori, Seiki, 5,491,596, Cl. 360-97.030.
Motomura, Masato, 5,491,661, Cl. 365-230.010.
Sakuma, Hajime, 5,491,825, Cl. 395-775.000.
Suzuki, Mieko; Homma, Tetsuya; Murao, Yukinobu; Tanigawa, Takaho; and Koga, Hiroki, 5,491,108, Cl. 437-192.000.
Yoshikawa, Minoru, 5,491,363, Cl. 257-715.000.

Nedelchev, Orlin: *See*—
Nenov, Nikolay N.; and Nedelchev, Orlin, 5,490,851, Cl. 606-61.000.

Neesley, Thomas J.: *See*—
Allard, Larry D.; Granowski, Richard K.; and Neesley, Thomas J., 5,490,432, Cl. 73-865.900.

Negre, Eric: *See*—
Roberts, David D.; Krutzsch, Henry C.; Sipes, John M.; Guo, Neng-hua; and Negre, Eric, 5,491,130, Cl. 514-13.000.

Neidlinger, Stephan; and Bolze, Thomas, to Siemens Aktiengesellschaft. Passive optical telecommunication system. 5,491,575, Cl. 359-137.000.

Neill, Paul L.: *See*—
Grier, Laura A.; Neill, Paul L.; Priester, Ralph D.; Mobley, Larry W.; Skaggs, Kenneth W.; and Turner, Robert B., 5,491,174, Cl. 521-126.000.

Neiss, David A., to Motorola, Inc. Method and apparatus for selectively squelching analog signals produced by a paging terminal. 5,491,836, Cl. 455-38.500.

Nelson, Carl W.; and Weir, Richard D., to Tulip Memory Systems, Inc. Circularly symmetric sputtering apparatus with hollow-cathode plasma devices. 5,490,910, Cl. 204-192.150.

Nelson, Frances C.; and Schiehser, Guy A., to American Home Products Corporation. Hindered N-oxide esters of rapamycin. 5,491,231, Cl. 540-456.000.

Nelson, Russell; and LeBlanc, John. Three point tri-roll threaded ring gauge that is adjustable with wear detectors. 5,490,333, Cl. 33-199.00R.

Němec, Jiří: *See*—
Špindler, Zdeněk; Burýšek, František; Němec, Jiří; Novotný, Vojtěch; Lásko, Josef; Blasel, Miroslav; and Talacko, Oldřich, 5,490,375, Cl. 57-263.000.

Nemeth, Joe: *See*—
Fisher, Michael G.; and Nemeth, Joe, 5,490,854, Cl. 606-88.000.

Nenov, Nikolay N.; and Nedelchev, Orlin. Method and apparatus for treatment of idiopathic scoliosis. 5,490,851, Cl. 606-61.000.

Nersesian, John. Food carrying skewer. 5,490,451, Cl. 99-420.000.

Nestec S.A.: *See*—
Knol, Jan; Marciset, Olivier; and Mollet, Beat, 5,491,079, Cl. 435-172.300.

Nestrick, Terry J.: *See*—
LaPack, Mark A.; Nestrick, Terry J.; Martin, William F.; and Klecka, Gary M., 5,490,933, Cl. 210-603.000.

Net Labs, Inc.: *See*—
Wanderer, James; Cooper, Claus; Gerolimatos, Mark; and Chen, Michele, 5,491,796, Cl. 395-200.090.

Neuert, Richard: *See*—
Huber, Bernd; and Neuert, Richard, 5,490,308, Cl. 19-239.000.

Neuhauser, Roy L., III: *See*—
Wascher, Rick R.; Fairbanks, Ray, Jr.; and Neuhauser, Roy L., III, 5,491,546, Cl. 356-4.030.

Neumann, Stephen M.: *See*—
DeBoer, Charles D.; Henzel, Richard P.; Neumann, Stephen M.; and Tutt, Lee W., 5,491,045, Cl. 430-200.000.

Nevalainen, Kyösti: *See*—
Rämö, Seija; Nevalainen, Kyösti; and Vehviläinen, Pekka, 5,490,405, Cl. 70-366.000.

Nevestveit, Hjalmar: *See*—
Brännström, Roine; and Nevestveit, Hjalmar, 5,490,469, Cl. 110-245.000.

New Japan Chemical Co., Ltd.: *See*—
Ikeda, Naoki; Yoshimura, Masafumi; Mizoguchi, Kazuaki; and Kimura, Yoshiharu, 5,491,188, Cl. 524-229.000.

New York University: *See*—
Rapoport, David M.; and Norman, Robert G., 5,490,502, Cl. 128-204.230.

Newman, Edwin. Leak prevention in underwater power generation. 5,491,366, Cl. 290-53.000.

Newman, Keith G., to LSI Logic Corporation. Method of making integrated circuit package having multiple bonding tiers. 5,490,324, Cl. 29-830.000.

Newman, LaVerne R.; and Bogovican, Dragan, to United Technologies Automotive, Inc. Combination wash/wiper contact subassembly. 5,491,312, Cl. 200-61.540.

Neya, Masahiro: *See*—
Hemmi, Keiji; Neya, Masahiro; Marusawa, Hiroshi; Watanabe, Shinya; and Hashimoto, Masashi, 5,491,132, Cl. 514-18.000.

NGK Spark Plug Co., Ltd.: *See*—
Miyata, Shigeru; Yamada, Yoshitaka; Yoshida, Hideji; Matsubara, Yoshihiro; and Ito, Yasuo, 5,491,417, Cl. 324-402.000.

Nguyen, Clark T.-C.; and Howe, Roger T., to University of California, The Regents of the. Q-controlled microresonators and tunable electronic filters using such resonators. 5,491,604, Cl. 361-278.000.

Nguyen, Du V.: *See*—
Bahr, Allen A.; Nguyen, Du V.; and Teichman, Gary A., 5,491,391, Cl. 318-39.000.

Nibby, Chester M., Jr.: *See*—
Keeley, James W.; Lemay, Richard A.; Nibby, Chester M., Jr.; Petry, Keith L.; and Hirsch, Thomas S., 5,491,790, Cl. 395-183.120.

Nicewarner, Earl R., Jr., to Fairchild Space and Defense Corporation. Three-dimensional modular assembly of integrated circuits. 5,491,612, Cl. 361-760.000.

Nicholas, David A.; Russell, Brian G.; Zvenyatsky, Boris; Matula, Paul A.; and Remiszewski, Stanley H., to United States Surgical Corporation. Articulating endoscopic surgical apparatus. 5,490,819, Cl. 600-201.000.

Nichols, Michael P. Light attachment for a thermostat. 5,491,615, Cl. 362-23.000.

Nicklis, Rainer, to Siemens Aktiengesellschaft. Measuring range adapter. 5,491,406, Cl. 324-115.000.

Nicol, Jo-Ann: *See*—
Hanns, David T.; and Carrall, Christopher R., 5,490,571, Cl. 175-323.000.

Niebur, William S.; Hoffbeck, Loren J.; and Williams, Terrill E., to Pioneer Hi-Bred International, Inc. Hybrid corn plant and seed (3525). 5,491,290, Cl. 800-200.000.

Niebur, William S.; Riley, Raymond D.; and Noble, Stephen W., to Pioneer Hi-Bred International, Inc. Hybrid corn plant and seed. 5,491,295, Cl. 800-200.000.

Niederst, Ken W.: *See*—
Nugent, Richard M., Jr.; Niederst, Ken W.; and Seiner, Jerome A., 5,491,204, Cl. 525-523.000.

Nielsen, Robert L.: *See*—
Allen, Wade C.; Goodwin, Jeremy P.; Nielsen, Robert L.; Reder, Paul J.; and Toltzman, Douglas, 5,491,822, Cl. 395-700.000.

Nielsen, Ruby I.: *See*—
Manker, Denise C.; Rosendahl, Connie N.; Heide, Morten; Bachmann, Torben L.; and Nielsen, Ruby I., 5,491,122, Cl. 504-100.000.

Nielson, Lyman O. Method of retrofitting fluorescent light fixtures and punch and die assembly therefor. 5,490,326, Cl. 29-876.000.

Niemann, James A.; and Topala, George, to Keithley Instruments. Guarded printed circuit board islands. 5,490,325, Cl. 29-846.000.

Nigro, Arthur R.: *See—*
Driscoll, Edward K.; Nigro, Arthur R.; and Fillio, Thomas D., 5,490,723, Cl. 312-334.280.

Nihon Dixie Company Limited: *See—*
Iioka, Akira; Ishii, Kenji; and Oguma, Yasushi, 5,490,631, Cl. 229-403.000.

Niimura, Koichi; Kawabe, Takako; Wada, Tsutomu; Saitoh, Tsuyoshi; and Bannai, Kenji, to Kureha Kagaku Kogyo Kabushiki Kaisha. Estradiol derivative alkylating agent conjugate with reduced hormonal activity, process for preparing the same, compounds useful for the preparation thereof, and growth inhibiting composition containing the conjugate or estradiol derivative. 5,491,138, Cl. 514-182.000.

Nikon Corporation: *See—*
Sakamoto, Hiroshi, 5,491,533, Cl. 354-416.000.
Suzuki, Fumio; and Sato, Shigemasa, 5,491,532, Cl. 354-410.000.

Nilssen, Ole K. Instant-on screw-in fluorescent lamp. 5,491,385, Cl. 315-178.000.

Nilsson, Per. Transfer apparatus. 5,490,293, Cl. 5-83.100.

Nilz, Gerhard: *See—*
Hagen, Helmut; Nilz, Gerhard; Roetsch, Thomas; Walter, Helmut; and Landes, Andreas, 5,491,123, Cl. 504-104.000.

NiOptics Corporation: *See—*
Winston, Roland; and Gleckman, Philip L., 5,491,620, Cl. 362-346.000.

Nippon Conlux Co., Ltd.: *See—*
Nishiumi, Kenji; Osawa, Toshio; Shimizu, Kanesue; and Machida, Shinichi, 5,490,588, Cl. 194-317.000.

Nippon Filcon Co., Ltd.: *See—*
Fujisawa, Shigenobu, 5,490,543, Cl. 139-383.00A.

Nippon Oil Company, Limited: *See—*
Mazaki, Hitoshi; Toyooka, Takehiro; and Itoh, Hiroyuki, 5,491,001, Cl. 427-162.000.

Nippon Paint Co., Ltd.: *See—*
Yamada, Mitsuo; Kawakami, Ichiro; Nojiri, Hiroyuki; and Ishii, Toshiyuki, 5,491,183, Cl. 523-404.000.

Nippon Steel Corporation: *See—*
Ohno, Yasuhide; and Ohzeki, Yoshio, 5,491,034, Cl. 428-606.000.
Sawada, Kikuzo, 5,491,656, Cl. 365-185.290.

Nippon Thompson Co., Ltd.: *See—*
Ishihara, Toyohisa, 5,490,729, Cl. 384-43.000.

Nippondenso Co., Ltd: *See—*
Kato, Hideki; Matsuzawa, Tosio; Shimizu, Touru; Yamanaka, Tetsuji; and Kouno, Yoshiyuki, 5,490,487, Cl. 123-399.000.
Kitamura, Keiichi; Honda, Shin; and Sakakibara, Hisayoshi, 5,490,397, Cl. 62-474.000.

Nishimoto, Kenichi: *See—*
Hagiwara, Shinji; Kobayashi, Kouichi; Shimokawa, Kouji; and Nishimoto, Kenichi, 5,490,573, Cl. 180-68.100.

Nishimura, Hiroshi: *See—*
Eriguchi, Hiroyasu; Nishimura, Hiroshi; Yamamoto, Minoru; Iwahori, Yutaka; and Kamoi, Takeshi, 5,491,386, Cl. 315-209.00R.

Nishimura, Ken-ichi; Yoshimi, Akihisa; Mori, Takayoshi; Kakeya, Nobuharu; Kikuchi, Masahiro; Kondoh, Nobuo; Uchida, Takeshi; and Yamanouchi, Koichi, to Kyoto Pharmaceutical Industries, Ltd.; and Green Cross Corporation, The. Pharmaceutical preparation containing prostaglandin compound for rectal or vaginal administration. 5,491,171, Cl. 514-558.000.

Nishimura, Koichi, to Fujitsu Limited. Synchronous/asynchronous system having function of switching path upon fault. 5,491,696, Cl. 370-16.100.

Nishimura, Takashi: *See—*
Shimokobe, Jiro; Kamohara, Eiji; and Nishimura, Takashi, 5,491,382, Cl. 315-17.000.

Nishiumi, Kenji; Osawa, Toshio; Shimizu, Kanesue; and Machida, Shinichi, to Nippon Conlux Co., Ltd. Coin processing apparatus. 5,490,588, Cl. 194-317.000.

Nishiyama, Takanori: *See—*
Umezawa, Koichi; Kuriyama, Hiroyuki; Nishiyama, Takanori; Ishida, Kiyoshi; and Ishinabe, Iwao, 5,491,507, Cl. 348-14.000.

Nishizawa, Yukio: *See—*
Nozawa, Takahiro; Nishizawa, Yukio; and Tanifuji, Naoki, 5,491,520, Cl. 348-625.000.

Nissan Motor Co., Ltd.: *See—*
Kato, Yuuji; and Hagiwara, Yoshichika, 5,490,815, Cl. 477-181.000.

Noakes, Timothy J.: *See—*
Jeffries, Andrew; Green, Michael L.; and Noakes, Timothy J., 5,490,633, Cl. 239-691.000.

Noble, Stephen W.: *See—*
Niebur, William S.; Riley, Raymond D.; and Noble, Stephen W., 5,491,295, Cl. 800-200.000.

Noble, Stephen W., Jr.; Williams, Norman E.; Stucker, David S.; Segebart, Robert L.; and Keaschall, Joseph W., to Pioneer Hi-Bred International, Inc. Hybrid corn plant and seed (3279). 5,491,289, Cl. 800-200.000.

Nobusada, Toshihide: *See—*
Itakura, Keijirou; Nobusada, Toshihide; Toyoda, Yasuyuki; Saitoh, Yukio; Kokusenya, Noboru; Nagayoshi, Ryouichi; Tanaka, Hironori; and Ozaki, Masayoshi, 5,491,512, Cl. 348-321.000.

Nobuyuki, Yamada; Takahiro, Douke; and Hidetoshi, Tsuji, to Toto Ltd. Power regulator of discharge lamp and variable color illumination apparatus using the regulator. 5,491,388, Cl. 315-308.000.

NOF Corporation: *See—*
Umehara, Takafumi; Shimada, Eiji; and Sugimoto, Tadashi, 5,491,202, Cl. 525-438.000.

Nohno, Hitoshi: *See—*
Tagawa, Takao; Nohno, Hitoshi; Nozaki, Kiyohiro; and Okamura, Kazunari, 5,491,706, Cl. 371-57.200.

Nojima, Hideo; Shintaku, Hidetaka; Nagata, Masaya; Fujimoto, Manabu; and Koba, Masayoshi, to Sharp Kabushiki Kaisha. Superconducting magnetic sensor having a ferromagnetic element for converging an external magnetic field. 5,491,410, Cl. 324-248.000.

Nojiri, Hiroyuki: *See—*
Yamada, Mitsuo; Kawakami, Ichiro; Nojiri, Hiroyuki; and Ishii, Toshiyuki, 5,491,183, Cl. 523-404.000.

Nokia Mobile Phones Ltd.: *See—*
Gould, Adam F.; Robertson, James R.; Noneman, John W.; and Gelm, John R., 5,491,718, Cl. 375-205.000.
Malkamaki, Esa; and Jokinen, Harri, 5,491,832, Cl. 455-33.100.

Nolten, Henk G.: *See—*
Warmerdam, Theo W.; Nolten, Henk G.; Day, Edward W.; Hetzer, Joseph S.; and Goel, Anil B., 5,490,876, Cl. 106-213.000.

Nomoto, Tsuyoshi: *See—*
Yamamoto, Nobuko; Tomida, Yasuko; Ohyama, Junji; Nomoto, Tsuyoshi; and Kawaguchi, Masahiro, 5,491,093, Cl. 436-71.000.

Nomura, Shinya: *See—*
Kiuchi, Kazuhiko; Nakai, Shigeo; Sawa, Masuo; Kato, Masayuki; Sakai, Mitsuru; and Nomura, Shinya, 5,491,180, Cl. 523-139.000.

Noneman, John W.: *See—*
Gould, Adam F.; Robertson, James R.; Noneman, John W.; and Gelm, John R., 5,491,718, Cl. 375-205.000.

Nonin Medical Inc.: *See—*
Isaacson, Philip O.; Gadtke, David W.; and Johnson, Timothy L., 5,490,523, Cl. 128-633.000.

Noppe, Marcus J. M.; and Konings, Frank J., to Janssen Pharmaceutica N.V. Method for depositing metal particles on a marker. 5,491,098, Cl. 436-525.000.

Norbeck, Daniel W.: *See—*
Stuk, Timothy L.; Allen, Michael S.; Haight, Anthony R.; Kerdesky, Francis A.; Langridge, Denton C.; Leanna, M. Robert; Lijewski, Linda M.; Melcher, Laura; Morton, Howard E.; Norbeck, Daniel W.; Reno, Daniel S.; Robbins, Timothy A.; Scarpetti, David; Sham, Hing L.; Sowin, Thomas J.; Tien, Jien-Heh J.; and Zhao, Chen, 5,491,253, Cl. 560-27.000.

Nordson Corporation: *See—*
Davis, Dennis; Beam, Harold D.; and Kruke, Jeffrey J., 5,490,726, Cl. 366-152.100.

Norman, Colin F.: *See—*
Evans, Christopher M.; and Norman, Colin F., 5,491,029, Cl. 428-423.100.

Norman, Robert G.: *See—*
Rapoport, David M.; and Norman, Robert G., 5,490,502, Cl. 128-204.230.

Noro, Fumihiko: *See—*
Miyamoto, Kyoko; and Noro, Fumihiko, 5,491,101, Cl. 437-43.000.

Noro, Michimasa: *See—*
Murakami, Makoto; Noro, Michimasa; and Ito, Takao, 5,490,798, Cl. 439-310.000.

Norris, Elwood G.; Daberko, Norbert P.; and Brightbill, Steven T., to Comp General Corporation. Handheld record and playback device with flash memory. 5,491,774, Cl. 395-2.790.

Northeast Pharmosciences: *See—*
Riccobono, Juanita R.; and Ludman, Jacques E., 5,491,569, Cl. 359-3.000.

Northstar Industries, Inc.: *See—*
Best, John W.; Flippo, Bob K.; Walker, James D.; and Carter, Gary D., 5,490,592, Cl. 198-812.000.

Noteborn, Matheus H. M.; and de Boer, Gerben F., to Aesculaap B.V. Cloning of chicken anaemia DNA. 5,491,073, Cl. 435-69.100.

Novo Nordisk A/S: *See—*
Manker, Denise C.; Rosendahl, Connie N.; Heide, Morten; Bachmann, Torben L.; and Nielsen, Ruby I., 5,491,122, Cl. 504-100.000.
Zamost, Bruce L.; and Elm, Dana D., 5,491,087, Cl. 435-200.000.

Novo Nordisk Entotech, Inc.: *See—*
Manker, Denise C.; Rosendahl, Connie N.; Heide, Morten; Bachmann, Torben L.; and Nielsen, Ruby I., 5,491,122, Cl. 504-100.000.

Novof, Ilya I: *See—*
Kelkar, Ram; Novof, Ilya I; and Wyatt, Stephen D., 5,491,439, Cl. 327-157.000.

Novotný, Vojtěch: *See—*
Špindler, Zdeněk; Burýšek, František; Němec, Jiří; Novotný, Vojtěch; Lásko, Josef; Blasel, Miroslav; and Talacko, Oldřich, 5,490,375, Cl. 57-263.000.

Nowosielski, Joseph M.: *See—*
Levran, Alexander; Nowosielski, Joseph M.; Ton-That, Giao M.; Rajagopalan, Ramamoorthy; and Mabboux, Henri, 5,491,624, Cl. 363-87.000.

Nozaki, Kiyohiro: *See—*
Tagawa, Takao; Nohno, Hitoshi; Nozaki, Kiyohiro; and Okamura, Kazunari, 5,491,706, Cl. 371-57.200.

Nozawa, Takahiro; Nishizawa, Yukio; and Tanifuji, Naoki, to Victor Company of Japan, Ltd. Contour correcting circuit for sharpening rising and falling edges of video signals. 5,491,520, Cl. 348-625.000.

Nugent, Richard M., Jr.; Niederst, Ken W.; and Seiner, Jerome A., to PPG Industries, Inc. Gas barrier coating from reacting polyamine, alkanolamine and polyepoxide. 5,491,204, Cl. 525-523.000.

Nuñez, Ivan M.; Molock, Frank F.; Elliott, Laura D.; and Ford, James D., to Johnson & Johnson Vision Products, Inc. Method of forming shaped hydrogel articles including contact lenses using inert, displaceable diluents. 5,490,959, Cl. 264-2.600.

Nuñez, Ivan M.; Molock, Frank F.; Elliott, Laura D.; and Ford, James D., to Johnson & Johnson Vision Products, Inc. Method of forming shaped hydrogel articles including contact lenses using inert, displaceable diluents. 5,490,960, Cl. 264-2.600.

Nutt, Michael O.: *See*—
Rooney, Peter C.; and Nutt, Michael O., 5,491,263, Cl. 564-369.000.

Nyberg, Petri: *See*—
Huovila, Jyrki; Nyberg, Petri; and Odell, Michael, 5,490,905, Cl. 162-212.000.

Oba, Satoshi: *See*—
Nagashima, Teruo; Oba, Satoshi; Ishizuka, Tomomi; and Masuda, Hiroyuki, 5,490,667, Cl. 271-225.000.

O'Brien, Michael J.; Carabbio, Robert M.; Hemsath, Bill; Knussmann, Kevin D.; and Robbins, Thomas C., to Signature Technologies, Inc. Method and apparatus for controlling a press. 5,491,647, Cl. 364-551.020.

Odell, Michael: *See*—
Huovila, Jyrki; Nyberg, Petri; and Odell, Michael, 5,490,905, Cl. 162-212.000.

Oder, Reuben E.: *See*—
Peterson, Robert J.; Webb, Michael D.; and Oder, Reuben E., 5,490,966, Cl. 264-318.000.

Odle, James A. Multimedia capture and audit system for a video surveillance network. 5,491,511, Cl. 348-153.000.

Oelfke, Russell H.: *See*—
Colle, Karla S.; and Oelfke, Russell H., 5,491,269, Cl. 585-15.000.

Ogasawara, Manabu: *See*—
Akita, Hideki; Ota, Makoto; Nakatani, Hideaki; Hatano, Kazuyoshi; and Ogasawara, Manabu, 5,490,730, Cl. 384-147.000.

Ogawa, Ryota; and Kato, Hiroyuki, to Asahi Kogaku Kogyo Kabushiki Kaisha. Afocal zooming optical system. 5,491,588, Cl. 359-676.000.

Ogden, Aubrey D.: *See*—
Kau, Chin-Cheng; Ogden, Aubrey D.; and Waldecker, Donald E., 5,491,829, Cl. 395-800.000.

Oguma, Yasushi: *See*—
Iioka, Akira; Ishii, Kenji; and Oguma, Yasushi, 5,490,631, Cl. 229-403.000.

Ogura, Toshiyuki: *See*—
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Olson, Kristin. Window display photo album. 5,490,739, Cl. 402-79.000.

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Kaneko, Hiroyuki, 5,490,321, Cl. 29-714.000.
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Setcavage, Thomas M.; Reis, Kathleen J.; Davies, Donald M.; and Mazur, Edward J., 5,491,067, Cl. 435-7.250.
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Schröder-Brumloop, Helmut L.; and Belkner, Andreas O. F., 5,491,405, Cl. 323-299.000.
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Van Rens, Russell J., 5,490,534, Cl. 137-1.000.
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Bakhshi, Shiv K.; Williams, Steven H.; Scott, James W.; Haines, Randall M.; and McGrath, Ralph D., 5,490,961, Cl. 264-6.000.
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Gebhart, Walter M., 5,491,553, Cl. 356-375.000.

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Goetschel, Christian J.; Greene, Robert A.; Kertis, Robert A.; Philpott, Rick A.; Richetta, Raymond A.; Schmerbeck, Timothy J.; Schulte, Donald J.; and Swart, David P., 5,491,441, Cl. 327-291.000.
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Holmes, Timothy B.; and Scsavnicki, Paul M., 5,491,415, Cl. 324-322.000.

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Armentrout, Charles, 5,491,331, Cl. 250-214.0VT.

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Sugawara, Kazuaki; and Ito, Hideo, 5,491,560, Cl. 358-342.000.

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Luedtke, Roy, Jr.; and Carrigan, Lori L., 5,491,286, Cl. 800-200.000.
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Noble, Stephen W., Jr.; Williams, Norman E.; Stucker, David S.; Segebart, Robert L.; and Keaschall, Joseph W., 5,491,289, Cl. 800-200.000.
Webb, David M., 5,491,081, Cl. 435-172.300.

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Roba, Giacomo S., 5,491,581, Cl. 359-341.000.

Pirl, William E., to Westinghouse Electric Corporation. System and method for laser welding an inner surface of a tubular member. 5,491,317, Cl. 219-121.640.

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Plunkett, Thomas P.; and Kestly, Michael J., to Dana Corporation. Three layer metal gasket with dual coating. 5,490,681, Cl. 277-235.00B.

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Pneumafil Corporation: *See—*
Williams, Roger D.; and Gengler, Mark S., 5,490,392, Cl. 62-91.000.

Pocalyko, David J.: *See—*
Richardson, Norman K.; Schilling, Kurt M.; Pocalyko, David J.; and Bailey, Peter L., 5,490,980, Cl. 424-94.600.

Podavini, Giacomo: *See—*
Despland, Claude; Gnagi, Christophe; and Podavini, Giacomo, 5,490,996, Cl. 426-548.000.

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Weber, Willes H.; Poindexter, Bennie D.; and Remillard, Jeffrey T., 5,490,490, Cl. 123-697.000.

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Polar Electro Oy: *See—*
Suni, Jouko; and Tammi, Tapio, 5,491,474, Cl. 340-870.310.

Polensky, Donald, to Lockheed Missiles & Space Co., Inc. Safe with refractory laminate walls. 5,490,468, Cl. 109-80.000.

Polishak, Jeffery T.: *See—*
Pressnall, Dana W.; Polishak, Jeffery T.; Felix, Bradley K.; Durisin, Michael J.; and Ellison, Joseph, 5,491,625, Cl. 364-133.000.

Polizzotti, Richard S.; McCandlish, Larry E.; and Kugler, Edwin L., to Exxon Research and Engineering Company. Metal article and method for producing the same (c-2580). 5,490,968, Cl. 419-2.000.

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Dane, Gary T., 5,490,975, Cl. 422-300.000.

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Pondaven, Gérald: *See—*
Bouraly, Jean-Pierre; Aebi, Jurg; Beaufils, Philippe; de Lestang, Michel; Gaffuri, Jean-Gilles; Hourlier, Hervé; Lallement, Jean-Jacques; Legroux, Philippe; Levai, Jean-Paul; Pondaven, Gérald; Schuster, Pierre; and Vergnat, Christian, 5,490,855, Cl. 606-88.000.

Porembski, Horst, to Patent-Treuhand-Gesellschaft F. Elektrische Gluehlampen mbH. Double-based low-pressure discharge lamp with misalignment-tolerant bases. 5,491,374, Cl. 313-318.020.

Pöschl, Günter, to PPV-Verwaltungs-AG. Disc-shaped mixing tool with conically beveled through bones. 5,490,727, Cl. 366-316.000.

Potter, Allan F., to Alliant Techsystems Inc. Sonar transducer with unitary isolator. 5,491,671, Cl. 367-158.000.

Potucek, Frank R., III, to Echo Incorporated. Debris guard for lawn edger. 5,490,371, Cl. 56-17.200.

Powdertech Co., Ltd.: *See—*
Sato, Yuji; Fukumoto, Toshiyuki; Imamura, Yoshifumi; and Honjo, Toshio, 5,491,042, Cl. 430-108.000.

Powell, Bruce A.; and Walker, Joseph C., to Otis Elevator Company. Automated selection of a load weight bypass threshold for an elevator system. 5,490,580, Cl. 187-281.000.

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Boyette, James H.; Comeaux, Leo C.; Siso, Angel L.; Mansell, J. Douglas; and Fike, Jonn E., Jr., 5,490,390, Cl. 62-9.000.
Nugent, Richard M., Jr.; Niederst, Ken W.; and Seiner, Jerome A., 5,491,204, Cl. 525-523.000.

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Prasher, Douglas: *See—*
Chalfie, Martin; and Prasher, Douglas, 5,491,084, Cl. 435-189.000.

Precision Connector Designs, Inc.: *See—*
Hetzel, Kurt C.; Farnsworth, Jeffery A.; and Harper, Patrick H., 5,490,795, Cl. 439-266.000.

Premo, Thomas G.: *See—*
Benes, Kevin C.; Colleran, Stephen A.; Gugelmeyer, Robert J.; and Premo, Thomas G., 5,490,800, Cl. 439-567.000.

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Ratcliffe, Ralph D.; and Van Der Sleen, Roelof, 5,490,579, Cl. 187-266.000.

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Price, Jeffrey E.: *See—*
Shen, Robert W.; and Price, Jeffrey E., 5,490,987, Cl. 424-464.000.

Priest, John F., to Western Atlas International, Inc. Method for determining the thickness of a casing in a wellbore by signal processing pulse-echo data from an acoustic pulse-echo imaging tool. 5,491,668, Cl. 367-35.000.

Priester, Ralph D.: *See—*
Grier, Laura A.; Neill, Paul L.; Priester, Ralph D.; Mobley, Larry W.; Skaggs, Kenneth W.; and Turner, Robert B., 5,491,174, Cl. 521-126.000.

Prinsen, Wilhelmus J. C.: *See—*
Bibbe, Christiaan P. M.; Hester, Martinus J.; Prinsen, Wilhelmus J. C.; and van de Weyer, Fransiscus J. M., 5,491,499, Cl. 347-47.000.

Procter & Gamble Company, The: *See—*
Corrigan, Patrick J., 5,490,995, Cl. 426-531.000.
Demuth, Thomas P., Jr.; and White, Ronald E., 5,491,139, Cl. 514-192.000.
Kenneally, Corey J., 5,491,226, Cl. 536-115.000.
Peterson, Robert J.; Webb, Michael D.; and Oder, Reuben E., 5,490,966, Cl. 264-318.000.
Villagran, Francisco V.; McCabe, Gregory M.; and Wong, Vincent Y.-L., 5,490,999, Cl. 426-633.000.

Projectavision, Inc.: *See—*
Dolgoff, Eugene, 5,491,585, Cl. 359-449.000.

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D'Obrenan, Jean V.; Madigou, Nicole; and Deriaud, Thierry, 5,490,869, Cl. 75-10.140.

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Behrens, Friedrich-Otto; Proössler, Ulrich; and Voigt, Jürgen, 5,490,725, Cl. 366-76.900.

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Mann, Stephen, 5,491,219, Cl. 530-391.100.

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Bouraly, Jean-Pierre; Aebi, Jurg; Beaufils, Philippe; de Lestang, Michel; Gaffuri, Jean-Gilles; Hourlier, Hervé; Lallement, Jean-Jacques; Legroux, Philippe; Levai, Jean-Paul; Pondaven, Gérald; Schuster, Pierre; and Vergnat, Christian, 5,490,855, Cl. 606-88.000.

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Brandenburg, Klaus; Kluge, Klaus-Peter; Richter, Kurt-Hermann; and Weber, Wendelin, 5,490,735, Cl. 400-614.000.

Puranen, Jussi E. T., to Durand-Raute Industries Ltd. Method and apparatus for controlling veneer lathe knife clearance angle. 5,490,548, Cl. 144-356.000.

Purdy, Craig: *See—*
Middle, George H.; Evans, Edward A.; and Purdy, Craig, 5,490,860, Cl. 606-171.000.

Purps, Hans-Joachim: *See—*
Scheer, Hans; Beiersdorf, Wolf-Dieter; and Purps, Hans-Joachim, 5,491,189, Cl. 524-259.000.

Purser, Robert W., to FireMelt International, Inc. Fire extinguishing panels. 5,490,566, Cl. 169-26.000.

Purushothaman, Sampath: *See—*
Mok, Lawrence S.-W.; Purushothaman, Sampath; Sammakia, Bahgat G.; Wilczynski, Janusz S.; and Wu, Tien Y., 5,491,610, Cl. 361-695.000.

Puyol, Diego R.: *See—*
Puyol, Manuel R.; and Puyol, Diego R., 5,491,131, Cl. 514-14.000.

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Pyde, Richard A.: *See—*
Macia, Narciso F.; and Pyde, Richard A., 5,490,924, Cl. 210-257.100.

Quaghebeur, Theo; and Van Loocke, Walter, to Sandoz Ltd. Herbicidal compositions comprising chloroacetamide and triketone herbicides. 5,491,124, Cl. 504-139.000.

Quantum Lerning Systems, Inc.: *See—*
Duron, James R., 5,491,704, Cl. 371-40.100.

Quilite International Limited Liability Company: *See—*
Kotter, Rodman W., 5,491,309, Cl. 181-285.000.

Quinetics Corporation: *See—*
Ashbrook, Clifford L., 5,490,313, Cl. 29-275.000.

Quinn, David B.: *See—*
Duce, Richard W.; Quinn, David B.; and McCauley, Kathryn M., 5,490,412, Cl. 73-23.310.

Qwest Communications: *See—*
Thompson, Phillip F.; Finck, Howard D.; Sheppard, Donald K.; and DeHetre, Gregory G., 5,491,797, Cl. 395-200.030.

Rabinowitz, Harold N.: *See—*
Wan, Chung-Zong; Tauster, Samuel J.; and Rabinowitz, Harold N., 5,490,977, Cl. 423-210.000.

Racz, Gabor J. R-X safety catheter. 5,490,845, Cl. 604-266.000.

Radamis, Maged: *See—*
Pawlak, Andrzej M.; Lin, William C.; Graber, David W.; Eckhardt, Dennis C.; Weiss, Scott E.; Radamis, Maged; Perry, Thomas A.; and Bradley, John R., 5,491,632, Cl. 364-424.050.

Rademacher, Darrell G.: *See—*
Marceau, Justin; and Rademacher, Darrell G., 5,491,326, Cl. 235-381.000.

Radhakrishnan, Sockalingan: *See—*
Fatzinger, Peter A.; Leung, Martin K.; Chou, Kevin; and Radhakrishnan, Sockalingan, 5,491,819, Cl. 395-600.000.

Radosav, Jon J.; Dudek, David M.; Browar, Orest T.; and Ralle, Angelo G., to John Crane Inc. Split mechanical face seal. 5,490,682, Cl. 277-815.000.

Raeymaekers, Alfons H. M.: *See—*
Janssen, Marcel A. C.; Raeymaekers, Alfons H. M.; Freyne, Eddy J. E.; and Greco, Michael N., 5,491,161, Cl. 514-394.000.

Rahn, Brian, to ASC Incorporated. Hinge for a folding roof in a convertible automotive vehicle. 5,490,709, Cl. 296-122.000.

Rahn, Caryl M.: *See—*
Glowny, David A.; Kistenmacher, John C.; Rahn, Caryl M.; and Thomas, Jerry C., 5,491,791, Cl. 395-183.130.

Raj, Kuldip; Torres, James; and Lanphear, Susan, to Ferrofluidics Corporation. Ferrofluid pressure sensor and warning device. 5,490,425, Cl. 73-745.000.

Rajagopalan, Ramamoorthy: *See—*
Levran, Alexander; Nowosielski, Joseph M.; Ton-That, Giao M.; Rajagopalan, Ramamoorthy; and Mabboux, Henri, 5,491,624, Cl. 363-87.000.

Rajashekara, Kaushik: *See—*
Schneider, Eric D.; McMullen, Steven R.; Rajashekara, Kaushik; Loynes, Wayne J.; Boys, William E.; and Martin, Ronald A., 5,491,370, Cl. 310-54.000.

Rake, Lance G.; and Krantz, Kermit T. Playing cards with gripping surface. 5,490,676, Cl. 273-294.000.

Rakuljic, George A.; and Leyva, Victor, to Accuwave Corporation. Methods and devices for using photorefractive materials at infrared wavelengths. 5,491,570, Cl. 359-7.000.

Ralle, Angelo G.: *See—*
Radosav, Jon J.; Dudek, David M.; Browar, Orest T.; and Ralle, Angelo G., 5,490,682, Cl. 277-815.000.

Ramakrishnan, K. K.: *See—*
Jain, Rajendra K.; Ramakrishnan, K. K.; and Chiu, Dah-Ming, 5,491,801, Cl. 395-200.130.

Ramana, Vasili V.; Yamuna. Kami R.; and Jaunakais, Ivars, to Industrial Test Systems, Inc. Test strip for free chlorine analysis. 5,491,094, Cl. 436-125.000.

Rämö, Seija; Nevalainen, Kyösti; and Vehviläinen, Pekka, to Abloy Security Ltd Oy. Cylinder lock—key—combination. 5,490,405, Cl. 70-366.000.

Rand, Roy E.: *See—*
Boyd, Douglas P.; and Rand, Roy E., 5,491,734, Cl. 378-10.000.

Rando, Joseph F., to Spectra-Physics Scanning Systems, Inc. Checkout counter scanner having multiple scanning surfaces. 5,491,328, Cl. 235-462.000.

Rangel, Louis. Multi-purpose arrow assembly tool. 5,490,747, Cl. 408-227.000.

Ranoia, Joseph J.: *See—*
Ranoia, Vincent J.; and Ranoia, Joseph J., 5,491,014, Cl. 428-156.000.

Ranoia, Vincent J.; and Ranoia, Joseph J. Non-slip film leader. 5,491,014, Cl. 428-156.000.

Rao, Ramana R.: *See—*
Withgott, M. Margaret; Bagley, Steven C.; Bloomberg, Dan S.; Halvorsen, Per-Kristian; Huttenlocher, Daniel P.; Cass, Todd A.; Kaplan, Ronald M.; and Rao, Ramana R., 5,491,760, Cl. 382-203.000.

Rao, V. Durga N.; and Yeager, David A., to Ford Motor Company. Ultra low device volume piston system. 5,490,445, Cl. 92-155.000.

Rapoport, David M.; and Norman, Robert G., to New York University. Method and apparatus for optimizing the continuous positive airway pressure for treating obstructive sleep apnea. 5,490,502, Cl. 128-204.230.

Rappoport, Vitaliy: *See—*
Lim, Chun B.; Kline, Barry D.; Jiang, Jinghua J.; and Rappoport, Vitaliy, 5,491,342, Cl. 250-363.090.

Rat, Sylvie: *See—*
Jano, Patrice; and Rat, Sylvie, 5,490,643, Cl. 244-3.110.

Ratcliffe, Ralph D.; and Van Der Sleen, Roelof, to Preventative Maintenance Systems. Tanker access platform. 5,490,579, Cl. 187-266.000.

Ratliff, James A.: *See—*
Kraemer, Mark S.; and Ratliff, James A., 5,491,637, Cl. 364-468.000.

Raulfs, Friedrich-Wilhelm: *See—*
Dix, Johannes P.; Baus, Ulf; Beck, Karin H.; and Raulfs, Friedrich-Wilhelm, 5,491,043, Cl. 430-110.000.

Raychem Corporation: *See—*
Huynh, Van L.; Bower, Robert M.; Griffin, Steven D.; and Mickus, Deborah A., 5,491,766, Cl. 385-100.000.
McMills, Corey; and Mattis, John, 5,490,803, Cl. 439-276.000.
McMills, Corey; and Mattis, John, 5,491,315, Cl. 200-504.000.

RCA Thomson Licensing Corporation: *See—*
Casavant, Scott D.; and Savatier, Tristan, 5,491,516, Cl. 348-415.000.

Rebours, Claude; and Barbe, Gerard, to Société Franco-Belge de Fabrication de Combustibles. Device for measuring the force exerted by a grid spring. 5,490,418, Cl. 73-161.000.

Recot, Inc.: *See—*
Fisher, Andrew, 5,490,587, Cl. 193-35.00A.

Red Rose Environmental, Inc.: *See—*
Fryer, David T., 5,490,741, Cl. 405-128.000.

Reddy, Alla V. K. Prophylactic device. 5,490,525, Cl. 128-842.000.

Reddy, T. Damodar: *See—*
Coffman, Tim M.; Lin, Sung-Wei; and Reddy, T. Damodar, 5,491,809, Cl. 395-430.000.

Reder, Paul J.: *See—*
Allen, Wade C.; Goodwin, Jeremy P.; Nielsen, Robert L.; Reder, Paul J.; and Toltzman, Douglas, 5,491,822, Cl. 395-700.000.

Reed, Patricia M., to Daisy Kingdom. Heat induced rotating lamp shade. 5,491,616, Cl. 362-35.000.

Reeves, Mark E.; Hartfel, Margaret A.; Rouser, Forrest J.; Smith, Kenneth L.; and Benson, Olester, Jr., to Minnesota Mining and Manufacturing Company. Slip control sheeting and articles covered with same. 5,491,015, Cl. 428-167.000.

Reflexite Corporation: *See—*
Phillips, Edward D., 5,491,586, Cl. 359-530.000.

Reh, Jeff: *See—*
Hutsell, Larry; Bruner, Curt; Reh, Jeff; and Albert, Glenn, 5,491,395, Cl. 318-560.000.

Reichert, Dirk-Stefan; Hahmann, Günther; and Falb, Wolfgang, to Drägerwerk AG. Anesthetic evaporator with intermediate container. 5,490,500, Cl. 128-204.130.

Reichert, Ronald E.; and Beuch, Donald, to RTI Corporation. Manipulation and transport device for rolled materials. 5,490,756, Cl. 414-619.000.

Reichhold Chemicals, Inc.: *See—*
Warmerdam, Theo W.; Nolten, Henk G.; Day, Edward W.; Hetzer, Joseph S.; and Goel, Anil B., 5,490,876, Cl. 106-213.000.

Reis, Kathleen J.: *See—*
Setcavage, Thomas M.; Reis, Kathleen J.; Davies, Donald M.; and Mazur, Edward J., 5,491,067, Cl. 435-7.250.

Remillard, Jeffrey T.: *See—*
Weber, Willes H.; Poindexter, Bennie D.; and Remillard, Jeffrey T., 5,490,490, Cl. 123-697.000.

Remiszewski, Stanley H.: *See—*
Nicholas, David A.; Russell, Brian G.; Zvenyatsky, Boris; Matula, Paul A.; and Remiszewski, Stanley H., 5,490,819, Cl. 600-201.000.

Renard, Pierre: *See—*
Caubere, Paul; Jamart-Gregoire, Brigitte; Caubere, Catherine; Bizot-Espiard, Jean-Guy; Renard, Pierre; and Adam, Gérard, 5,491,163, Cl. 514-411.000.

Renbutsu, Tadashi, to Sanyo Electric Co., Ltd. Transfer roller controlled to position the paper in registration with the toner image. 5,491,543, Cl. 355-271.000.

Rendall, Martin: *See—*
Beaudet, Phillip; Merks, Eduardus A. T.; Rendall, Martin; and Spall, Roger, 5,491,795, Cl. 395-159.000.

Rennie, Foster W.; Chao, Tze; Eastham, Donald H.; and Tarbell, James V., to Du Pont de Nemours, E. I., and Company. Continuous ore reaction process by fluidizing. 5,490,976, Cl. 423-658.500.

Reno, Daniel S.: *See—*
Stuk, Timothy L.; Allen, Michael S.; Haight, Anthony R.; Kerdesky, Francis A.; Langridge, Denton C.; Leanna, M. Robert; Lijewski, Linda M.; Melcher, Laura; Morton, Howard E.; Norbeck, Daniel W.; Reno, Daniel S.; Robbins, Timothy A.; Scarpetti, David; Sham, Hing L.; Sowin, Thomas J.; Tien, Jien-Heh J.; and Zhao, Chen, 5,491,253, Cl. 560-27.000.

Ressemann, Thomas V.: *See—*
Mische, Hans A.; Ressemann, Thomas V.; Vrba, Anthony C.; and Hackett, Steven S., 5,490,859, Cl. 606-159.000.

Rexam Industries Corp.: *See—*
Holley, Leonard, 5,491,013, Cl. 428-40.000.

Rheinart, Charles: *See—*
Basso, Claude; Calvignac, Jean; Pham, Tan T.; and Rheinart, Charles, 5,491,815, Cl. 395-550.000.

Rho, Soo K.: *See—*
Kim, Ki I.; and Rho, Soo K., 5,490,998, Cl. 426-589.000.

Rhoads, Mike A.: *See—*
Fox, Frederick D.; Pearson, Douglas R.; Rhoads, Mike A.; and Zaleski, Peter A., 5,491,629, Cl. 364-420.000.

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Chaubet, Nicole; Gigot, Claude; Freyssinet, Georges; and Leroux, Bernard, 5,491,288, Cl. 800-205.000.

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Riccobono, Juanita R.; and Ludman, Jacques E., to Northeast Photosciences. High efficiency, broad bandwidth, volume holographic element for diffraction windows and method of manufacture. 5,491,569, Cl. 359-3.000.

Rice, Darron C.: *See—*
Myers, W. Neill; Shadoan, Michael D.; Forbes, John C.; Baker, Kevin J.; and Rice, Darron C., 5,490,831, Cl. 602-26.000.

Rice, Gregory H. Palm rest for use with computer data entry devices. 5,490,647, Cl. 248-118.100.

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Plyler, Robert G.; Rice, Terry A.; and Yi, Chong H., 5,490,802, Cl. 439-752.000.

Richardson, Norman K.; Schilling, Kurt M.; Pocalyko, David J.; and Bailey, Peter L., to Chesebrough-Pond's USA Co., Division of Conopco, Inc. Covalent bonding of active agents to skin, hair or nails. 5,490,980, Cl. 424-94.600.

Richardson, Orland W.; and Gerdeman, Roger J., to ATM Machining Inc. Automated multiple station cap printing apparatus. 5,490,456, Cl. 101-35.000.

Richetta, Raymond A.: *See—*
Goetschel, Christian J.; Greene, Robert A.; Kertis, Robert A.; Philpott, Rick A.; Richetta, Raymond A.; Schmerbeck, Timothy J.; Schulte, Donald J.; and Swart, David P., 5,491,441, Cl. 327-291.000.

Goetschel, Christian J.; Greene, Robert A.; Kertis, Robert A.; Philpott, Rick A.; Richetta, Raymond A.; Schmerbeck, Timothy J.; Schulte, Donald J.; and Swart, David P., 5,491,447, Cl. 330-254.000.

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Sinnhuber, Ruprecht; and Richter, Bernd, 5,490,691, Cl. 280-735.000.

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Ricoh Company, Ltd.: *See—*
Yagishita, Takahiro; and Yamazaki, Hajime, 5,491,506, Cl. 347-246.000.

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Riewenherm, Ulrich. Dental suction cannula. 5,490,780, Cl. 433-93.000.

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Niebur, William S.; Riley, Raymond D.; and Noble, Stephen W., 5,491,295, Cl. 800-200.000.

Rincon, Gabriel A.; Salamina, Nicolas; and Corsi, Marco, to Texas Instruments Incorporated. Amplifier circuit and method. 5,491,437, Cl. 327-108.000.

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Golz, Peter; Rinke, Andreas; and Krössmann, Jürgen, 5,490,589, Cl. 198-444.000.

Rios, Jose J.; and Worland, Mack D. Tractor-mounted stake driver. 5,490,568, Cl. 173-42.000.

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Robb, Paul N., to Lockheed Missiles & Space Company, Inc. Infrared lens systems. 5,491,583, Cl. 359-356.000.

Robb, Rose A.: *See—*
Dearing, Mary K.; and Robb, Rose A., 5,490,710, Cl. 297-162.000.

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Stuk, Timothy L.; Allen, Michael S.; Haight, Anthony R.; Kerdesky, Francis A.; Langridge, Denton C.; Leanna, M. Robert; Lijewski, Linda M.; Melcher, Laura; Morton, Howard E.; Norbeck, Daniel W.; Reno, Daniel S.; Robbins, Timothy A.; Scarpetti, David; Sham, Hing L.; Sowin, Thomas J.; Tien, Jien-Heh J.; and Zhao, Chen, 5,491,253, Cl. 560-27.000.

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Chartrain, Michel M.; Chen, Shieh-Shung T.; Garrity, George M.; Heimbuch, Brian; Roberge, Christopher; and Shafiee, Ali, 5,491,077, Cl. 435-118.000.

Roberson, Glenn A., Jr.: *See—*
Bernosky, Eugene W.; Geatz, J. Tobin; Ferrie, Edward T., Jr.; and Roberson, Glenn A., Jr., 5,490,611, Cl. 222-1.000.

Robert Bosch GmbH: *See—*
Becker, Ruediger, 5,490,381, Cl. 60-274.000.
Mayer, Ulrich; Kaltenbrunn, Peter; Hoeptner, Wolfgang; and Mischker, Karsten, 5,490,489, Cl. 123-630.000.

Robert, Edgar J.; Howie, F. James, III; Nagel, Christopher J.; and Griffin, Thomas P., to Molten Metal Technology, Inc. Method for top-charging solid waste into a molten metal bath. 5,491,279, Cl. 588-201.000.

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Robertshaw Controls Company: *See—*
Fowler, Daniel L.; and Hayes, William S., 5,491,614, Cl. 361-784.000.

Robertson, Glen E.; and Webster, John L., to Robertson, Glen E. Anchorless boat positioning employing global positioning system. 5,491,636, Cl. 364-432.000.

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Gould, Adam F.; Robertson, James R.; Noneman, John W.; and Gelm, John R., 5,491,718, Cl. 375-205.000.

Robertson, Neil L.: *See—*
Hughbanks, Timothy S.; Lee, Hin Pong E.; Phipps, Peter B. P.; Robertson, Neil L.; and Wallash, Albert J., 5,491,605, Cl. 360-113.000.

Robinson, James R.; and Sims, Marc J., to Tastemaker; Separation Equipment Technologies, Inc.; Mark Sims, S.F.E.; Robinson, James R.; and Sims, Marc J. Method and system for extracting a solute from a fluid using dense gas and a porous membrane. 5,490,884, Cl. 95-45.000.

Robson, Christopher J.; and May, Gregory J., to Hewlett-Packard Company. Information retrieval device for displaying and directly refreshing the display of a dynamically modifiable document. 5,491,785, Cl. 395-162.000.

Robson, Sharon L.: *See—*
Harper, Myron E.; Robson, Sharon L.; and Combs, Connie W., 5,491,742, Cl. 379-201.000.

Robur Corporation: *See—*
Fuesting, Dale A.; Stephan, William E.; and Merrick, Richard H., 5,490,393, Cl. 62-101.000.

Rockwell International Corporation: *See—*
White, Stanley A., 5,491,725, Cl. 375-324.000.

Rodriquez, Kelly M.: *See—*
Everett, David F.; Frech, John W.; Wright, Theodore; and Rodriquez, Kelly M., 5,491,468, Cl. 340-572.000.

Roeder, G. R. Konrad, to Uniden America Corporation. Method and apparatus for a dual mode keypad permitting one-touch telephone number dialing. 5,491,745, Cl. 379-355.000.

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Langhauser, Franz; Kerth, Jürgen; Schweier, Günther; Brintzinger, Hans-Herbert; Mansel, Stefan; Roell, Werner; and Kirsten, Robin, 5,491,205, Cl. 526-121.000.

Roetsch, Thomas: *See—*
Hagen, Helmut; Nilz, Gerhard; Roetsch, Thomas; Walter, Helmut; and Landes, Andreas, 5,491,123, Cl. 504-104.000.

Rogaway, Phillip W., to International Business Machines Corporation. Method and apparatus for entity authentication and key distribution secure against off-line adversarial attacks. 5,491,749, Cl. 380-21.000.

Rogaway, Phillip W.: *See—*
Bellare, Mihir M.; and Rogaway, Phillip W., 5,491,750, Cl. 380-21.000.

Rogers, Duane E.: *See—*
Blanchard, Clarence E.; Rogers, Duane E.; Hall, Charles B.; Mooney, Robert; Craig, W. Scott; and Bergman, Dean P., 5,490,804, Cl. 440-38.000.

Rogers, Larry C.: *See—*
Hebert, Paul W.; Floyd, Ted; Rogers, Larry C.; and Howe, Dorothy L., 5,490,437, Cl. 81-22.000.

Rohm and Haas Company: *See—*
Paik, Yi H.; Simon, Ethan S.; and Swift, Graham, 5,491,212, Cl. 528-363.000.
Walker, Frederick H.; Chung, Chao-Jen; and Mercurio, Andrew, 5,491,192, Cl. 525-7.400.

Rohm Co., Ltd.: *See—*
Inoue, Koichi; and Morishita, Takeshi, 5,491,401, Cl. 323-273.000.

Röll, Werner: *See—*
Hohmann, Friedrich; Röll, Werner; and Mörtel, Hans G., 5,490,974, Cl. 422-197.000.

Rolls-Royce plc: *See—*
Harrison, Andrew; and Park, Keith, 5,490,389, Cl. 60-737.000.

Romag Rohren und Maschinen AG: *See—*
Gresa, Louis, 5,490,922, Cl. 210-159.000.

Roman, William C.: *See—*
Williams, Gregory L.; and Roman, William C., 5,491,831, Cl. 455-33.100.

Romano, Goffredo: *See—*
Prevedello, Aldo; and Romano, Goffredo, 5,490,877, Cl. 106-668.000.

Romanovich, Michael: *See—*
Wermers, Vilas; and Romanovich, Michael, 5,490,875, Cl. 106-208.000.

Romer, Duane R.: *See—*
Shankar, Ravi B.; Pews, R. Garth; and Romer, Duane R., 5,491,155, Cl. 514-362.000.

Romine, Michael L. Measurement referencing and transferring instrument. 5,491,555, Cl. 356-399.000.

Rooney, Peter C.; and Nutt, Michael O., to Dow Chemical Company, The. Aminoethylation process for production of substituted ethylene diamines. 5,491,263, Cl. 564-369.000.

Roques, Bernard; and Fournie-Zaluski, Marie C., to Institut National de la Sante et de la Recherche Medicale (INSERM). Amino acid derivatives and their therapeutical applications. 5,491,169, Cl. 514-529.000.

Rose, David A.: *See—*
Whitman, Gary R.; and Rose, David A., 5,490,517, Cl. 128-774.000.

Rose, Leighton K. Legwork strengthening and training device. 5,490,826, Cl. 482-74.000.

Rosen, Robert K.; and Devore, David D., to Dow Chemical Company, The. Synthesis of group 4 metal diene complexes. 5,491,246, Cl. 556-7.000.

Rosenberg, Norman M. Medical manometer with flexible fluid collection tube. 5,490,514, Cl. 428-674.000.

Rosendahl, Connie N.: *See—*
Manker, Denise C.; Rosendahl, Connie N.; Heide, Morten; Bachmann, Torben L.; and Nielsen, Ruby I., 5,491,122, Cl. 504-100.000.

Rosiek, Thomas A.: *See—*

Van Meter, James P.; Bagchi, Pranab; Thomas, Brian; and Rosiek, Thomas A., 5,491,052, Cl. 430-545.000.

Rosier, Hendrik E., to Huck International, Inc. Ergonomic installation tool with selectable vacuum pintail collector. 5,490,311, Cl. 29-243.523.

Roster Control Systems, Ltd.: *See*—
Ferris, Royston, 5,491,672, Cl. 368-10.000.

Roth, Steven A. Anchor bolt assembly. 5,490,365, Cl. 52-704.000.

Rothfuss, Karl-Heinz: *See*—
Helms, Werner; Rothfuss, Karl-Heinz; and Wolf, Walter, 5,490,560, Cl. 165-173.000.

Rothrauff, Charles E.: *See*—
Meagher, John L.; Rothrauff, Charles E.; and Alexander, Trey, 5,491,695, Cl. 370-112.000.

Rouse, Gordon F.; and Volna, William M., to Honeywell Inc. Magnetometer vehicle detector. 5,491,475, Cl. 340-933.000.

Rouser, Forrest J.: *See*—
Jantschek, Robert J.; Rouser, Forrest J.; Sterner, Mark L.; and Testen, Theodore J., 5,490,808, Cl. 451-59.000.
Reeves, Mark E.; Hartfel, Margaret A.; Rouser, Forrest J.; Smith, Kenneth L.; and Benson, Olester, Jr., 5,491,015, Cl. 428-167.000.

Rousseau, Alain, to Serbio. Device for detecting the change of viscosity of a liquid electrolyte by depolarization effect. 5,491,408, Cl. 324-71.100.

RTI Corporation: *See*—
Reichert, Ronald E.; and Beuch, Donald, 5,490,756, Cl. 414-619.000.

Rub, Winfried; and Biener, Rainer, to Mannesmann Rexroth GmbH. Safety circuit for a servo-hydraulic regulating system. 5,490,442, Cl. 91-445.000.

Rudibaugh, John W.; and Van Auken, Charles L., to Pennsy Corporation. Plug assemblies and methods for plugging holes in railroad autorack cars. 5,490,464, Cl. 105-422.000.

Rupe, James O. Golf bag cover. 5,490,594, Cl. 206-315.400.

Russell, Brian G.: *See*—
Nicholas, David A.; Russell, Brian G.; Zvenyatsky, Boris; Matula, Paul A.; and Remiszewski, Stanley H., 5,490,819, Cl. 600-201.000.

Russo, Roger; and Lauro, Paul, to Russo, Roger. Leg length analyzer. 5,490,518, Cl. 128-774.000.

Rustman, James C.: *See*—
Maxson, William R.; Heiniger, Jerry D.; and Rustman, James C., 5,491,407, Cl. 324-174.000.

Rutledge, Robert A.: *See*—
Patel, Arvind M.; Rutledge, Robert A.; and So, Bum S., 5,491,698, Cl. 371-6.000.

Rutschmann, Erwin, to Dr. Ing. h.c.F. Porsche AG. Air intake system of an internal-combustion engine. 5,490,484, Cl. 123-184.490.

Ruttenberg, John C., to Silicon Graphics, Inc. Loop scheduler. 5,491,823, Cl. 395-700.000.

Rutterman, Michael J.; and Hsiao, Leslie. Non-rotating wheel cover. 5,490,342, Cl. 40-587.000.

S. C. Johnson & Son, Inc.: *See*—
Sandvick, Paul E.; and Verbrugge, Calvin J., 5,491,190, Cl. 524-322.000.

Saarinen, Kari, to ABB Strömberg Drives OY. Method and apparatus for determination of refiner mechanical pulp properties. 5,491,340, Cl. 250-339.060.

Sachdev, Manoj, to U.S. Philips Corporation. $I_{DDQ}$-testable RAM. 5,491,665, Cl. 365-201.000.

Sachs, Emanuel M.; Cima, Michael J.; Bredt, James F.; and Khanuja, Satbir, to Massachusetts Institute of Technology. Process for removing loose powder particles from interior passages of a body. 5,490,882, Cl. 134-1.000.

Sada, Shinri, to Daikin Industries, Ltd. Refrigeration apparatus. 5,490,399, Cl. 62-510.000.

Saddow, Stephen E.: *See*—
Kim, Anderson H.; Youmans, Robert J.; Saddow, Stephen E.; Jasper, Louis J., Jr.; and Weiner, Maurice, 5,491,490, Cl. 343-895.000.

Saito, Asao: *See*—
Suzuki, Toshio; Saito, Asao; Shibata, Makoto; Kobayashi, Junichi; Komuro, Hirokazu; Mori, Toshihiro; Koyama, Shuji; Yokoyama, Sakai; Koizumi, Ryoichi; and Murakami, Keiichi, 5,491,505, Cl. 347-203.000.

Saito, Atsushi: *See*—
Maeda, Takeshi; Saito, Atsushi; and Ide, Hiroshi, 5,491,678, Cl. 369-59.000.

Saito, Kimitsugu: *See*—
Koyamao, Hisasi; Miyata, Koichi; Saito, Kimitsugu; Dreifus, David L.; and Stoner, Brian R., 5,491,348, Cl. 257-66.000.

Saito, Shigeo: *See*—
Yokota, Minoru; Nagata, Masayuki; Saito, Shigeo; and Yamada, Yuichi, 5,491,127, Cl. 505-433.000.

Saito, Shigeru, to Kansei Corporation. Discharge lamp lighting circuit for increasing electric power fed in initial lighting of the lamp. 5,491,387, Cl. 315-307.000.

Saito, Taro: *See*—
Ishino, Renshiro; Saito, Taro; and Sunahata, Matsumi, 5,491,369, Cl. 310-26.000.

Saitoh, Tsuyoshi: *See*—
Niimura, Koichi; Kawabe, Takako; Wada, Tsutomu; Saitoh, Tsuyoshi; and Bannai, Kenji, 5,491,138, Cl. 514-182.000.

Saitoh, Yukio: *See*—
Itakura, Keijirou; Nobusada, Toshihide; Toyoda, Yasuyuki; Saitoh, Yukio; Kokusenya, Noboru; Nagayoshi, Ryouichi; Tanaka, Hironori; and Ozaki, Masayoshi, 5,491,512, Cl. 348-321.000.

Saitou, Shinji: *See*—
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Sakagami, Tetsuya: *See*—
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Sakai, Hiroshi: *See*—
Takatani, Setsuo; and Sakai, Hiroshi, 5,490,506, Cl. 128-633.000.

Sakai, Koji; and Shirata, Akio, to Sumitomo Wiring Systems, Ltd. Bundle-of-electric wire container. 5,490,595, Cl. 206-408.000.

Sakai, Mitsuru: *See*—
Kiuchi, Kazuhiko; Nakai, Shigeo; Sawa, Masuo; Kato, Masayuki; Sakai, Mitsuru; and Nomura, Shinya, 5,491,180, Cl. 523-139.000.

Sakakibara, Hisayoshi: *See*—
Kitamura, Keiichi; Honda, Shin; and Sakakibara, Hisayoshi, 5,490,397, Cl. 62-474.000.

Sakamoto, Hiroshi, to Nikon Corporation. Electronic flash control system and method for high-speed flashing. 5,491,533, Cl. 354-416.000.

Sakuma, Choji: *See*—
Tajiri, Akihiro; Hotta, Yoshihiko; Ishikawa, Mitsuru; Sakuma, Choji; and Yuri, Nobuyuki, 5,490,572, Cl. 180-65.100.

Sakuma, Hajime, to NEC Corporation. Microprocessor having a functionally multiplexed input and output terminal. 5,491,825, Cl. 395-775.000.

Sakumoto, Kazumi, to Seiko Instruments Inc. Pace generating device. 5,490,816, Cl. 482-3.000.

Salahshour, Abdorelza: *See*—
Williams, Marvin L.; and Salahshour, Abdorelza, 5,491,626, Cl. 364-401.000.

Salamina, Nicolas: *See*—
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Salansky, Werner. Machine for delivering balls, especially tennis balls. 5,490,493, Cl. 124-78.000.

Salisbury, Timothy M.: *See*—
Chylinski, Henryk J.; Jacobson, Chester F.; Salisbury, Timothy M.; and Borden, Frederick R., 5,490,329, Cl. 30-49.000.

Salituro, Francesco G.; and Baron, Bruce M., to Merrell Dow Pharmaceuticals Inc. 3-amidoindolyl derivative. 5,491,153, Cl. 514-339.000.

Salmon, Peter M.: *See*—
Devine, Denise L.; Katz, Sheila M.; Salmon, Peter M.; and Sweet, M. Lynne, 5,490,997, Cl. 426-573.000.

Salomon, Mary F.: *See*—
Smith, Thomas R.; Salomon, Mary F.; Davis, Kirk E.; Karn, Jack L.; and Cahoon, John M., 5,490,945, Cl. 252-18.000.

Sammakia, Bahgat G.: *See*—
Mok, Lawrence S.-W.; Purushothaman, Sampath; Sammakia, Bahgat G.; Wilczynski, Janusz S.; and Wu, Tien Y., 5,491,610, Cl. 361-695.000.

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Ahn, Tae-hyuk; Nam, In-ho; and Yoon, Joo-young, 5,491,103, Cl. 437-52.000.
Jeong, Jechang; and Ahn, Wooyoun, 5,491,509, Cl. 348-402.000.
Kim, Tae E., 5,491,761, Cl. 382-251.000.
Kim, Young G.; Hur, Woon G.; and Ye, Byeong S., 5,490,400, Cl. 68-23.300.
Lee, Yong H.; and Seo, Young W., 5,491,100, Cl. 437-41.000.
Mun, Zin-Suk; and Bae, Myung-Ho, 5,491,435, Cl. 327-55.000.

Sanchez, Robert R.: *See*—
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Sanden Corporation: *See*—
Kanou, Hiroshi; Terauchi, Kiyoshi; Fukai, Isamu; and Ogura, Toshiyuki, 5,490,767, Cl. 417-222.100.

Sanden International (U.S.A.), Inc.: *See*—
Calhoun, John L., 5,490,769, Cl. 418-1.000.

Sandoz Ltd.: *See*—
Gisler, Markus; and Wald, Roland, 5,491,221, Cl. 534-618.000.
Quaghebeur, Theo; and Van Loocke, Walter, 5,491,124, Cl. 504-139.000.

Sandvick, Paul E.; and Verbrugge, Calvin J., to S. C. Johnson & Son, Inc. Repulpable hot melt polymer/fatty acid compositions for fibrous products. 5,491,190, Cl. 524-322.000.

Sanford, Charles: *See*—
Bartlett, Charles S.; Benning, Roger D.; Hunter, John B.; Sanford, Charles; and Zuniga, Michael A., 5,491,747, Cl. 379-433.000.

Sanford, Norman A.: *See*—
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Sankyo Company, Limited: *See*—
Ishihara, Sadao; Kogen, Hiroshi; Koga, Teiichiro; Kitazawa, Eiichi; and Serizawa, Nobufusa, 5,491,167, Cl. 514-510.000.

Sanner, Axel: *See*—
Grabowski, Sven; Kah-Helbig, Astrid; Sanner, Axel; and Wendel, Kurt, 5,490,990, Cl. 424-486.000.

Sanshin Kogyo Kabushiki Kaisha: *See*—
Kato, Masahiko, 5,490,382, Cl. 60-297.000.

Santiesteban, Jose G.; Chang, Clarence D.; Vartuli, James C.; and Olson, David H., to Mobil Oil Corporation. Catalytic conversion of methanol to linear olefins. 5,491,273, Cl. 585-639.000.

Sanyo Electric Co., Ltd.: *See*—
Renbutsu, Tadashi, 5,491,543, Cl. 355-271.000.

Sardynski, Gary F., to Jet Spray Corp. Beverage dispenser tray assembly. 5,490,614, Cl. 222-129.100.

Sargeant, Matthew G.; and Neal, Michael A., to Advanced Control Technologies, Inc. Power line communication system. 5,491,463, Cl. 340-310.010.

Sargeant, Sean A.: *See*—
DePalma, Christopher L.; McHugh, William T.; Sargeant, Sean A.; Wiacek, Marian; and Yoppolo, Robert A., 5,491,038, Cl. 429-91.000.
Sarin, Vinod K.; and Arya, Shish P. S., to Trustees of Boston University. Enhanced adherence of diamond coatings. 5,491,028, Cl. 428-408.000.
Sarkar, Soumitra: *See*—
Britton, Kathryn H.; Chung, Tein-Yaw; Doeringer, Willibald; Dykeman, Harold D.; Edwards, Allan K.; Mathew, Johny; Pozefsky, Diane P.; Sarkar, Soumitra; and Turner, Roger D., 5,491,693, Cl. 370-85.130.
Saroya, Jagtar S., to American Magnetics Corporation. Universal magnetic medium encoder with tilt-compensating apparatus. 5,491,327, Cl. 235-449.000.
SAS TV Products, Inc.: *See*—
Mackay, Spencer L., 5,490,453, Cl. 99-495.000.
Sasaki, Yoshio, to Sony Corporation. Recording and/or reproducing apparatus and method of controlling same. 5,491,677, Cl. 369-44.360.
Sasuga, Eiichi: *See*—
Harada, Takashi; and Sasuga, Eiichi, 5,491,392, Cl. 318-376.000.
Sasuta, Michael D.; and Wolfe, John A., to Motorola, Inc. Method for maintaining audience continuity of a communication group call. 5,491,835, Cl. 455-34.100.
Sato, Akihiro, to Matsushita Electric Industrial Co. Ltd. Image motion vector detecting method and motion vector coding method. 5,491,523, Cl. 348-699.000.
Sato, Fumie; Amano, Takehiro; Kameo, Kazuya; Tanami, Tohru; Mutoh, Masaru; Ono, Naoya; and Goto, Jun, to Taisho Pharmaceutical Co., Ltd.; and Sato, Fumie. Prostaglandin derivatives. 5,491,254, Cl. 560-121.000.
Sato, Kenji, to Fujitsu Limited. Composite ring network having an increased redundancy for restoring communication path. 5,491,686, Cl. 370-16.100.
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Teel, Thomas A., 5,491,663, Cl. 365-189.050.
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Suzuki, Toshio; Saito, Asao; Shibata, Makoto; Kobayashi, Junichi; Komuro, Hirokazu; Mori, Toshihiro; Koyama, Shuji; Yokoyama, Sakai; Koizumi, Ryoichi; and Murakami, Keiichi, 5,491,505, Cl. 347-203.000.

Shieh, Jin-Ren. Padlock. 5,490,402, Cl. 70-39.000.

Shields, Henry: *See*—
Rieger, Harry; Shields, Henry; and Foster, Richard M., 5,491,707, Cl. 372-25.000.

Shields, Steven E.: *See*—
Williams, Ronald L.; Marsh, Ogden J.; and Shields, Steven E., 5,491,571, Cl. 359-59.000.

Shiga, Tohru; Okada, Akane; Takahashi, Hideroh; and Kurauchi, Toshio, to Kabushiki Kaisha Toyota Chuo Kenkyusho. Method for detecting stresses. 5,490,426, Cl. 73-762.000.

Shih, Yen-Jer: *See*—
Key, Charles R.; and Shih, Yen-Jer, 5,491,182, Cl. 523-206.000.

Shiina, Michihiro: *See*—
Iwai, Fumio; Ozawa, Katsuji; and Shiina, Michihiro, 5,491,529, Cl. 354-266.000.

Shiio, Ichiro; and Kobayashi, Makoto, to International Business Machines Corporation. Virtual conference system and terminal apparatus therefor. 5,491,743, Cl. 379-202.000.

Shimada, Eiji: *See*—
Umehara, Takafumi; Shimada, Eiji; and Sugimoto, Tadashi, 5,491,202, Cl. 525-438.000.

Shimada, Masanori: *See*—
Tanikake, Makoto; Morinaga, Yoshiki; Shirai, Katsuhiko; and Shimada, Masanori, 5,490,483, Cl. 123-65.00P.

Shimizu, Kanesue: *See*—
Nishiumi, Kenji; Osawa, Toshio; Shimizu, Kanesue; and Machida, Shinichi, 5,490,588, Cl. 194-317.000.

Shimizu, Keiko: *See*—
Hiyamuta, Shuichi; Shimizu, Keiko; and Kodota, Akihiko, 5,491,066, Cl. 435-7.400.

Shimizu, Mitsuru, to Fuji Photo Film Co., Ltd. Instant camera and manufacturing method of the same. 5,491,526, Cl. 354-86.000.

Shimizu, Seiji: *See*—
Takato, Hideyasu; and Shimizu, Seiji, 5,491,528, Cl. 354-225.000.

Shimizu, Touru: *See*—
Kato, Hideki; Matsuzawa, Tosio; Shimizu, Touru; Yamanaka, Tetsuji; and Kouno, Yoshiyuki, 5,490,487, Cl. 123-399.000.

Shimizu, Yasushi: *See*—
Shoji, Takeo; and Shimizu, Yasushi, 5,491,539, Cl. 355-200.000.

Shimokawa, Kouji: *See*—
Hagiwara, Shinji; Kobayashi, Kouichi; Shimokawa, Kouji; and Nishimoto, Kenichi, 5,490,573, Cl. 180-68.100.

Shimokobe, Jiro; Kamohara, Eiji; and Nishimura, Takashi, to Kabushiki Kaisha Toshiba. Color picture tube apparatus. 5,491,382, Cl. 315-17.000.

Shin-Etsu Handotai Co., Ltd.: *See*—
Hosokawa, Kaoru, 5,490,811, Cl. 451-239.000.

Shinoda, Ichiro: *See*—
Sato, Shinichi; Kumagai, Toshimitsu; Iwaguchi, Isao; and Shinoda, Ichiro, 5,491,330, Cl. 250-214.0AL.

Shintaku, Hidetaka: *See*—
Nojima, Hideo; Shintaku, Hidetaka; Nagata, Masaya; Fujimoto, Manabu; and Koba, Masayoshi, 5,491,410, Cl. 324-248.000.

Shintani, Akemi: *See*—
Gamo, Takaharu; Moriwaki, Yoshio; Iwaki, Tsutomu; and Shintani, Akemi, 5,490,970, Cl. 420-424.000.

Shiozawa, Takahisa, to Canon Kabushiki Kaisha. Exposure apparatus and microdevice manufacturing method using the same. 5,491,534, Cl. 355-69.000.

Shipley, Simon P., to GPT Limited. Optical signal transmission network. 5,491,573, Cl. 359-110.000.

Shipley, Simon P., to GEC-Marconi Limited. Optical signal transmission network. 5,491,574, Cl. 359-110.000.

Shirai, Katsuhiko: *See*—
Tanikake, Makoto; Morinaga, Yoshiki; Shirai, Katsuhiko; and Shimada, Masanori, 5,490,483, Cl. 123-65.00P.

Shiraki, Yasuhiro: *See*—
Seko, Yasuji; Otoma, Hiromi; Ueki, Nobuaki; Fukunaga, Hideki; Nakayama, Hideo; Ueyanagi, Kiichi; and Shiraki, Yasuhiro, 5,491,709, Cl. 372-45.000.

Shirane, Yoshiyuki; Iwasa, Seiichi; Suzuki, Yoshio; Kuramochi, Kiyoshi; Kokubo, Kazuo; Ohno, Tetsuya; Mizuno, Kimio; and Satoh, Takashi, to Honda Giken Kogyo Kabushiki Kaisha. Fault diagnostic system for vehicles using identification and program codes. 5,491,631, Cl. 364-424.040.

Shirata, Akio: *See*—
Sakai, Koji; and Shirata, Akio, 5,490,595, Cl. 206-408.000.

Shiro, Kazuhiro, to Aloka Co., Ltd. Diagnostic ultrasound apparatus. 5,490,510, Cl. 128-660.070.

Shiue, Jiang-Lin, to Taiwan Fu Hsing Industrial Co., Ltd. Dead bolt assembly for tubular door locks. 5,490,695, Cl. 292-1.500.

Shoji, Rihito; and Saitou, Shinji, to Matsushita Electric Industrial Co., Ltd. Pressure sensor with moisture resistance and uniform characteristics. 5,490,424, Cl. 73-728.000.

Shoji, Takeo; and Shimizu, Yasushi, to Canon Kabushiki Kaisha. Process cartridge and image forming apparatus adapted for the mounting of the same thereto with elastic member disposed therebetween. 5,491,539, Cl. 355-200.000.

Shonan Gosei-Jushi Seisakusho K.K.: *See*—
Kamiyama, Takao; Yokoshima, Yasuhiro; and Endoh, Shigeru, 5,490,964, Cl. 264-36.000.

Short Brothers PLC: *See*—

Wilson, Robert S.; and Braniff, Mark A., 5,490,602, Cl. 216-56.000.
Shoup, Stephen G.: *See—*
Feucht, Joel D.; Shoup, Stephen G.; and Swanson, Victor E., 5,490,762, Cl. 415-168.100.
Showa Denko K. K.: *See—*
Matsui, Fumio; Uotani, Nobuo; Murakami, Masatoshi; and Itoh, Yuji, 5,491,203, Cl. 525-474.000.
Shtayer, Ronen; Alon, Naveh; and Alexander, Joffe, to Motorola, Inc. Method and apparatus for pacing asynchronous transfer mode (ATM) data cell transmission. 5,491,691, Cl. 370-61.000.
Shudy, Glenn R. Head positioner for CAT scans. 5,491,736, Cl. 378-20.000.
Shumway, Larry D.: *See—*
Freeman, Harrison L.; Jaaskelainen, William; Mustain, Richard G.; and Shumway, Larry D., 5,491,807, Cl. 395-401.000.
Shumway, Paul W., to American Fence Corp. Threadless pipe coupler. 5,490,694, Cl. 285-305.000.
Shuter, David. Method and apparatus for handling suturing needles. 5,490,858, Cl. 606-148.000.
Sica, Vanessa D.: *See—*
Stowell, Davin B.; Ando, Mari H.; and Sica, Vanessa D., 5,490,616, Cl. 222-472.000.
Siciliano, Marcina, to Elizabeth Arden Company, Division of Conopco, Inc. Cosmetic composition. 5,490,982, Cl. 424-401.000.
Siedband, Melvin P.: *See—*
Schaefer, Donald W., deceased; and Siedband, Melvin P., 5,490,520, Cl. 128-848.000.
Siegel, David W.: *See—*
Arimilli, Ravi K.; Dhawan, Sudhir; and Siegel, David W., 5,491,811, Cl. 395-471.000.
Siegel, Michael S.: *See—*
Christensen, Kenneth J.; Siegel, Michael S.; Strole, Norman C.; and Zeisz, Raymond L., Jr., 5,491,687, Cl. 370-17.000.
Siemens Aktiengesellschaft: *See—*
Filkorn, Thomas, 5,491,639, Cl. 364-488.000.
Keller, Herbert; and Bergmann, Dietmar, 5,490,386, Cl. 60-660.000.
Kopp, Walter; and Windele, Josef, 5,491,545, Cl. 355-290.000.
Neidlinger, Stephan; and Bolze, Thomas, 5,491,575, Cl. 359-137.000.
Nicklis, Rainer, 5,491,406, Cl. 324-115.000.
Wichner, Wolfgang; and Carbon, Ludwig, 5,491,549, Cl. 356-141.200.
Siemens Medical Systems, Inc.: *See—*
Kwon, Seojoong; Liu, Dong-Chyuan; and McDermott, Bruce A., 5,490,512, Cl. 128-661.010.
Naylor, Thomas K.; Crouse, Helen C.; and Muz, Edwin, 5,491,299, Cl. 174-36.000.
Siemens Power Corporation: *See—*
Patterson, John F.; Cooke, George C.; Yates, Jack; and Bjornard, Trond A., 5,491,733, Cl. 376-443.000.
Sigma-Tau Industrie Farmaceutiche Riunite S.p.A.: *See—*
Giannessi, Fabio; Castagnani, Roberto; Tinti, Maria O.; De Angelis, Francesco; De Witt, Paolo; and Misiti, Domenico, 5,491,260, Cl. 562-567.000.
Signature Technologies, Inc.: *See—*
O'Brien, Michael J.; Carabbio, Robert M.; Hemsath, Bill; Knussmann, Kevin D.; and Robbins, Thomas C., 5,491,647, Cl. 364-551.020.
Silicon Engineering, Inc.: *See—*
Sharp, P. Owen, 5,491,667, Cl. 365-205.000.
Silicon Graphics, Inc.: *See—*
Kinsel, John R., 5,491,702, Cl. 371-37.200.
Ruttenberg, John C., 5,491,823, Cl. 395-700.000.
Silverstein, Louis D.: *See—*
Allen, Robert R., deceased; Bruce, Richard H.; Chuang, Tzu-Chin; Fiske, Thomas G.; Fulks, Ronald T.; Hack, Michael; Ho, Jackson H.; Lewis, Alan G.; Martin, Russel A.; Silverstein, Louis D.; Steemers, Hugo L.; Stuber, Susan M.; Thompson, Malcolm J.; Turner, William D.; and Yao, William W., 5,491,347, Cl. 257-59.000.
Simon, Burkhard: *See—*
Berger, Johann; and Simon, Burkhard, 5,490,378, Cl. 60-39.230.
Simon, Ethan S.: *See—*
Paik, Yi H.; Simon, Ethan S.; and Swift, Graham, 5,491,212, Cl. 528-363.000.
Simons, Raymond B., to Methode Electronics, Inc. Molded connector with internal grounding. 5,490,789, Cl. 439-101.000.
Sims, Marc J.: *See—*
Robinson, James R.; and Sims, Marc J., 5,490,884, Cl. 95-45.000.
Singer, Helmut: *See—*
Loshaek, Samuel; and Singer, Helmut, 5,491,091, Cl. 436-1.000.
Sinibaldi, John C.: *See—*
Davis, Gordon T.; Linger, Judith M.; Mandalia, Baiju D.; Sinibaldi, John C.; Zevin, William M.; and Ziegenhain, Karl-Heinz, 5,491,720, Cl. 375-222.000.
Sinicio, Telma: *See—*
Correa, Mauro F. C.; Sinicio, Telma; and Achcar, Fernanda S., 5,490,847, Cl. 604-387.000.
Sinnhuber, Ruprecht; and Richter, Bernd, to Volkswagen AG. Vehicle safety arrangement for positioning a vehicle occupant. 5,490,691, Cl. 280-735.000.
Sinnott, Joseph F., Jr.: *See—*
Gordon, Robert D.; Sinnott, Joseph F., Jr.; and Walling, Lonnie S., 5,491,778, Cl. 395-133.000.
Siorek, Timothy: *See—*
Adams, Shawn L.; Siorek, Timothy; and Lucak, Mark A., 5,491,531, Cl. 375-354.000.
Sipes, John M.: *See—*
Roberts, David D.; Krutzsch, Henry C.; Sipes, John M.; Guo, Neng-hua; and Negre, Eric, 5,491,130, Cl. 514-13.000.
Sippican, Inc.: *See—*
Chace, Raymond A., Jr.; and Manning, Mark C., 5,490,473, Cl. 114-330.000.
Gifford, Michael M.; and Mackie, Kevin J., 5,490,971, Cl. 422-58.000.
Siso, Angel L.: *See—*
Boyette, James H.; Comeaux, Leo C.; Siso, Angel L.; Mansell, J. Douglas; and Fike, Jonn E., Jr., 5,490,390, Cl. 62-9.000.
Skaggs, Kenneth W.: *See—*
Grier, Laura A.; Neill, Paul L.; Priester, Ralph D.; Mobley, Larry W.; Skaggs, Kenneth W.; and Turner, Robert B., 5,491,174, Cl. 521-126.000.
Skell, Daniel G.; Skell, Eric D.; and Manthei, Michael A., to Electro-Pro, Inc. Dispensing method and apparatus that detects the presence and size of a cup and provides automatic fill control. 5,491,333, Cl. 250-222.100.
Skell, Eric D.: *See—*
Skell, Daniel G.; Skell, Eric D.; and Manthei, Michael A., 5,491,333, Cl. 250-222.100.
Skinner, Neal G.: *See—*
Schultz, Roger L.; Kyle, Donald G.; and Skinner, Neal G., 5,490,564, Cl. 166-374.000.
Skye, David A.: *See—*
Earle, Anthony; Graebe, Christopher M.; Glover, Edward C. T. S.; Skye, David A.; Taylor, Nicholas J.; and Ward, Paul C., 5,491,530, Cl. 354-313.000.
Slama, Lucien P.: *See—*
O'Mahony, Gerard M.; and Slama, Lucien P., 5,490,431, Cl. 73-862.331.
Slater, Billy R.: *See—*
Grisham, James S.; and Slater, Billy R., 5,491,792, Cl. 395-183.150.
Sliskovic, Drago R.: *See—*
Lee, Helen T.; Picard, Joseph A.; and Sliskovic, Drago R., 5,491,170, Cl. 514-538.000.
Lee, Helen T.; Picard, Joseph A.; Sliskovic, Drago R.; and Wierenga, Wendell, 5,491,172, Cl. 514-602.000.
Sloan Valve Company: *See—*
Whiteside, John F., 5,490,659, Cl. 251-40.000.
Slutz, David E., to General Electric Company. Multilayer CVD diamond films. 5,491,002, Cl. 427-249.000.
Small, Gary L., to VLSI Technology, Inc. Adaptable wafer probe assembly for testing ICs with different power/ground bond pad configurations. 5,491,426, Cl. 324-754.000.
Small, Kenneth T., to Echelon Corporation. Apparatus and method for providing AC isolation while supplying DC power. 5,491,402, Cl. 323-282.000.
Smart, Bruce E.: *See—*
Arentzen, Rene; Jadhav, Prabhakar K.; Kobos, Robert K.; and Smart, Bruce E., 5,491,083, Cl. 435-181.000.
Smart, Merlin L. Laminated ball bat. 5,490,669, Cl. 273-72.00R.
Smayling, Michael C.; Torreno, Manuel L., deceased (by Arlene Torreno, executrix), Jr; and Falessi, Georges, to Texas Instruments Incorporated. LDMOS transistor with self-aligned source/backgate and photo-aligned gate. 5,491,105, Cl. 437-54.000.
Smedley, William H.: *See—*
Haber, Terry M.; Smedley, William H.; and Foster, Clark B., 5,490,736, Cl. 401-40.000.
Haber, Terry M.; Smedley, William H.; and Foster, Clark B., 5,490,818, Cl. 482-52.000.
Smick, Gary L.; Kjer, Michael L.; and Koler, Michael B. Air intake filter for electric appliances. 5,490,336, Cl. 34-97.000.
Smid, Jacob K.; and Verschuur, Jacobus G., to Chem- Y GmbH. Liquid concentrated aqueous solutions of salts of alkyl ether carboxylic acid, and a process for preparing such solutions. 5,490,950, Cl. 252-174.210.
Smith, Charles C., Jr.: *See—*
Pfitzenmaier, Robert W.; and Smith, Charles C., Jr., 5,491,115, Cl. 501-4.000.
Smith, Daniel R., to Emhart Inc. Rivet setting tool. 5,490,312, Cl. 29-243.525.
Smith, John A. S.; and Shaw, Julian D., to British Technology Group Limited. Method of nuclear quadrupole resonance testing of integral spin quantum number systems. 5,491,414, Cl. 324-307.000.
Smith, Kenneth L.: *See—*
Reeves, Mark E.; Hartfel, Margaret A.; Rouser, Forrest J.; Smith, Kenneth L.; and Benson, Olester, Jr., 5,491,015, Cl. 428-167.000.
Smith, Paul: *See—*
Heeger, Alan J.; and Smith, Paul, 5,491,027, Cl. 428-401.000.
Smith, Robert F. Uniform-radiation caustic surface for photoablation. 5,490,849, Cl. 606-5.000.
Smith, Thomas R.; Salomon, Mary F.; Davis, Kirk E.; Karn, Jack L.; and Cahoon, John M., to Lubrizol Corporation, The. Lubricating compositions and concentrates. 5,490,945, Cl. 252-18.000.
Smith, W. Novis, to Lakeland Industries, Inc. Protective fabrics and garments. 5,491,022, Cl. 428-224.000.
SmithKline Beecham PLC: *See—*
Shelley, Peter R., 5,491,229, Cl. 540-456.000.
Smiths Industries Medical Systems, Inc.: *See—*
Hollister, William H., 5,490,503, Cl. 128-205.120.

Smoker, Beneul F.; Yoder, David J.; Smoker, Benjamin K.; Phillips, Frederick W.; and Beiler, Emanuel S., to Clean Burn, Inc. Cleanout header for multi oil furnaces. 5,490,495, Cl. 126-104.00R.

Smoker, Benjamin K.: *See*—
Smoker, Beneul F.; Yoder, David J.; Smoker, Benjamin K.; Phillips, Frederick W.; and Beiler, Emanuel S., 5,490,495, Cl. 126-104.00R.

Snamprogetti S.p.A.: *See*—
Prevedello, Aldo; and Romano, Goffredo, 5,490,877, Cl. 106-668.000.

Snow, Herbert P.: *See*—
Johnson, Charles L.; Miller, Allan A.; Snow, Herbert P.; and Miller, Vernon A., 5,491,297, Cl. 84-609.000.

Snowden, Patricia. Disposable toothcare assembly. 5,490,530, Cl. 132-311.000.

Snyder Industries, Inc.: *See*—
Davis, Thomas R., 5,490,603, Cl. 220-4.120.

Snyder, James R.: *See*—
Swedo, Raymond J.; Green, George D.; and Snyder, James R., 5,491,178, Cl. 522-74.000.

So, Bum S.: *See*—
Patel, Arvind M.; Rutledge, Robert A.; and So, Bum S., 5,491,698, Cl. 371-6.000.

Soble, Richard M.; Owens, Timothy E.; and Johnson, Gregg E., to Graymills Corporation. Automated cleaning of printing cylinders. 5,490,460, Cl. 101-424.000.

Societe Anonyme: M. Chemicals: *See*—
Corradi, Gabriel; and Pellegrino, Thierry, 5,490,879, Cl. 118-212.000.

Societe Europeenne de Propulsion: *See*—
Bonniot, Claude; Vuillamy, Didier; Desclos, Pierre; Tiret, Etienne; and Beaurain, André, 5,490,629, Cl. 239-265.150.
Castagnos, Stéphane; and Limousin, Jean-Louis, 5,490,892, Cl. 156-89.000.

Société Franco-Belge de Fabrication de Combustibles: *See*—
Rebours, Claude; and Barbe, Gerard, 5,490,418, Cl. 73-161.000.

Socket Butler Inc.: *See*—
Zupo, Alan L.; and Brown, Roger G., 5,490,438, Cl. 81-53.110.

Soderquist, Mark E.: *See*—
Schrader, David; Soderquist, Mark E.; and Heires, Mark D., 5,491,195, Cl. 525-71.000.

Soderwall, Marja-Liisa: *See*—
Toivola, Reijo J.; Karjalainen, Arto J.; Kurkela, Kauko O. A.; Soderwall, Marja-Liisa; Kangas, Lauri V. M.; Blanco, Guillermo L.; Sundquist, Hannu K.; and Kalapudas, Arja, 5,491,173, Cl. 514-648.000.

Sodini, Charles G.: *See*—
Herrmann, Frederick P.; and Sodini, Charles G., 5,491,803, Cl. 395-287.000.

Soeda, Yoshimi: *See*—
Nakamura, Toshio; Soeda, Yoshimi; Miyasaka, Toshifumi; and Iwata, Minoru, 5,490,319, Cl. 29-596.000.

Soeda, Yoshinobu: *See*—
Terashima, Yuji; Haruguchi, Takashi; Ohwaki, Hirohiko; and Soeda, Yoshinobu, 5,491,684, Cl. 369-219.000.

Soedjak, Helena S., to Kraft Foods, Inc. Method of stabilizing the color of the disodium salt of 5,5'-indigotin disulfonic acid. 5,490,994, Cl. 426-262.000.

Sofamor Danek Properties, Inc.: *See*—
Middle, George H.; Evans, Edward A.; and Purdy, Craig, 5,490,860, Cl. 606-171.000.

Sogabe, Chikayuki, to Hitachi, Ltd. Magnetic disk apparatus. 5,491,599, Cl. 360-106.000.

Sokoloff, Michael D.; and Johnson, Randy A., to Sokoloff, Michael D. Vortex connector. 5,490.545, Cl. 141-319.000.

Solari, Edward L.: *See*—
Yee, Dawson L.; and Solari, Edward L., 5,491,814, Cl. 395-550.000.

Somasundaram, M.; Watanabe, Akira; Huey, James D.; and Maheshwari, Dinesh, to Fujitsu Limited. Debug support in a processor chip. 5,491,793, Cl. 395-183.210.

Song, Dian: *See*—
Wellstood, Frederick C.; Mathai, Anna; Song, Dian; and Black, Randall C., 5,491,411, Cl. 324-248.000.

Sonnett, Gary J.; Sprouse, Frederick V.; Hector, David L.; Lowry, Robert G.; and Woodworth, Bradley M., to Sprouse and Sonnett, Inc. Hands free dental floss dispenser. 5,490,722, Cl. 312-237.000.

Sony Corporation: *See*—
Akagiri, Kenzo, 5,491,481, Cl. 341-87.000.
Aramaki, Junichi; and Kihara, Nobuyuki, 5,491,592, Cl. 360-59.000.
Engelking, Steven; and Sanchez, Robert R., 5,491,282, Cl. 588-261.000.
Hurwitt, Steven; and Weiss, Corey, 5,490,914, Cl. 204-298.120.
Sasaki, Yoshio, 5,491,677, Cl. 369-44.360.
Wilkinson, James H., 5,491,479, Cl. 341-58.000.

Sony Electronics Inc.: *See*—
Engelking, Steven; and Sanchez, Robert R., 5,491,282, Cl. 588-261.000.

Sony United Kingdom Ltd.: *See*—
Wilkinson, James H., 5,491,479, Cl. 341-58.000.

Sopchak, James L.: *See*—
Wormell, Dean C.; Huettig, Fred R.; Jankevics, Andrew J.; Winter, Michael; and Sopchak, James L., 5,491,642, Cl. 364-509.000.

Sopha Medical: *See*—
Fleury, Christophe; and Pare, Christian, 5,490,296, Cl. 5-601.000.

Soretel: *See*—
D'Obrenan, Jean V.; Madigou, Nicole; and Deriaud, Thierry, 5,490,869, Cl. 75-10.140.

Sorge, Joseph A.: *See*—
McKenzie, Douglas T.; and Sorge, Joseph A., 5,491,062, Cl. 435-6.000.

Sound Leisure Limited: *See*—
Black, Alan J., 5,490,677, Cl. 273-351.000.

Southwest Research Institute: *See*—
Stevens, David J.; Mayer, Joseph B., Jr.; and Marchand, Kirk A., 5,490,661, Cl. 256-13.100.

Sowin, Thomas J.: *See*—
Stuk, Timothy L.; Allen, Michael S.; Haight, Anthony R.; Kerdesky, Francis A.; Langridge, Denton C.; Leanna, M. Robert; Lijewski, Linda M.; Melcher, Laura; Morton, Howard E.; Norbeck, Daniel W.; Reno, Daniel S.; Robbins, Timothy A.; Scarpetti, David; Sham, Hing L.; Sowin, Thomas J.; Tien, Jien-Heh J.; and Zhao, Chen, 5,491,253, Cl. 560-27.000.

Spadafora, V. James; Brady, Thomas E.; and Motoyoshi, Masatoshi, to Eastman Kodak Company. Method and composition for the prevention, control and amelioration of soilborne fungi and disease caused thereby. 5,491,157, Cl. 514-369.000.

Spall, Roger: *See*—
Beaudet, Phillip; Merks, Eduardus A. T.; Rendall, Martin; and Spall, Roger, 5,491,795, Cl. 395-159.000.

Spaltro, Suree M.; Ananthapadmanabhan, Kavssery; Aronson, Michael P.; and Frushour, Michael, to Chesebrough-Pond's USA Co., Division of Conopco, Inc. Block copolymers of polysaccharides and polyalkylene oxides. 5,490,978, Cl. 424-49.000.

Sparco, Inc.: *See*—
Kuster, Hans L.; and Lebkuchner, Benno, 5,490,874, Cl. 96-204.000.

Spatafora, Mario, to Azionaria Costruzioni Macchine Automatiche A.C.M.A. S.p.A. Wrapping machine, particularly for food products such as sweets and similar. 5,490,368, Cl. 53-234.000.

Speaker, Tully J., to Commonwealth System of Higher Education, Temple University of the. Encapsulated perfluorocarbons. 5,490,986, Cl. 424-451.000.

Special Metals Corporation: *See*—
Fountain, Richard W.; and Asgar, Kamal, 5,490,870, Cl. 75-255.000.

Speck, Steven: *See*—
Giebel, Michael; Speck, Steven; and Love, Randy, 5,490,494, Cl. 126-41.00R.

Spector, Donald. Toy hoop. 5,490,806, Cl. 446-48.000.

Spectra-Physics Scanning Systems, Inc.: *See*—
Rando, Joseph F., 5,491,328, Cl. 235-462.000.

Speer, Richard A., to Ohio Fire Absorbent, Inc. Fire extinguishing blanket. 5,490,567, Cl. 169-50.000.

Špindler, Zdeněk; Burýšek, František; Němec, Jiří; Novotný, Vojtěch; Lásko, Josef; Blasel, Miroslav; and Talacko, Oldřich, to Elitex ÚSTÍ Nad Orlicí. Method of respinning using ancillary yarn. 5,490,375, Cl. 57-263.000.

Spitzer, Richard. High resolution imaging and measuring dynamic surface effects of substrate surfaces. 5,491,338, Cl. 250-307.000.

Sport Carriers, Incorporated: *See*—
Dixon, Michael; Hudson, James B.; and Apogee, Jon, 5,490,621, Cl. 224-319.000.

Sportsman, J. Richard, to Eli Lilly and Company. Antigen detection with affinity chromatography and parallel processing a control. 5,491,096, Cl. 436-518.000.

Sprouse and Sonnett, Inc.: *See*—
Sonnett, Gary J.; Sprouse, Frederick V.; Hector, David L.; Lowry, Robert G.; and Woodworth, Bradley M., 5,490,722, Cl. 312-237.000.

Sprouse, Frederick V.: *See*—
Sonnett, Gary J.; Sprouse, Frederick V.; Hector, David L.; Lowry, Robert G.; and Woodworth, Bradley M., 5,490,722, Cl. 312-237.000.

Square D Company: *See*—
Levran, Alexander; Nowosielski, Joseph M.; Ton-That, Giao M.; Rajagopalan, Ramamoorthy; and Mabboux, Henri, 5,491,624, Cl. 363-87.000.

Staley, J. D., Jr.: *See*—
Hildwein, Roger L.; Uschold, Robert C.; Staley, J. D., Jr.; Riestenberg, Paul; Gallagher, Laura; and Nagao, Rex, 5,490,843, Cl. 604-164.000.

Stander, Maxwell; and Chander, Radhakrishnan. Wrist arm exerciser. 5,490,817, Cl. 482-46.000.

Stanford Surgical Technologies, Inc.: *See*—
Stevens, John H., 5,490,833, Cl. 604-4.000.

Stansfield, Anthony I.: *See*—
Barnaby, Catherine L.; Gammack, Richard J.; and Stansfield, Anthony I., 5,491,703, Cl. 371-40.100.

Starfire Electronic Development & Marketing, Ltd.: *See*—
Goldstein, Avery N., 5,491,114, Cl. 437-233.000.

Stark, Edmund J.; Schultz, John A.; Ecker, Ernest L.; and DeVries, Robert A., to Dow Chemical Company, The. Process for purifying vinylically unsaturated compounds prepared using a palladium-complex catalyst. 5,491,250, Cl. 556-466.000.

State of Isreal, Atomic Energy Commission: *See*—
Pri-Bar, Ilan; Azoulay, David; and Buchman, Ouri, 5,490,919, Cl. 208-262.100.

Stayer, Mark L., Jr.: *See*—
Lawson, David F.; Antkowiak, Thomas A.; Hall, James E.; and Stayer, Mark L., Jr., 5,491,230, Cl. 540-450.000.

Steemers, Hugo L.: *See*—
Allen, Robert R., deceased; Bruce, Richard H.; Chuang, Tzu-Chin; Fiske, Thomas G.; Fulks, Ronald T.; Hack, Michael; Ho, Jackson H.; Lewis, Alan G.; Martin, Russel A.; Silverstein, Louis D.; Steemers, Hugo L.; Stuber, Susan M.; Thompson, Malcolm J.; Turner, William D.; and Yao, William W., 5,491,347, Cl. 257-59.000.

Stehle, Heinz: *See—*
Foeldi, Tamás; Stehle, Heinz; Heim, Udo; Xuan, Hai T.; and Wuest, Rainer, 5,491,635, Cl. 364-431.100.

Steier, James R.: *See—*
Velasquez, Galilea F.; and Steier, James R., 5,490,309, Cl. 24-90.100.

Stein, Daniel C.; Piekarowicz, Andrejez S.; and Yuan, Robert T., to University of Maryland, The. Mutant strain of *E. coli* for detection of methyltransferase clones. 5,491,060, Cl. 435-6.000.

Stemmer, Willem P. C.: *See—*
Aldwin, Lois; Madden, Mark; and Stemmer, Willem P. C., 5,491,074, Cl. 435-69.700.

Stephan, William E.: *See—*
Fuesting, Dale A.; Stephan, William E.; and Merrick, Richard H., 5,490,393, Cl. 62-101.000.

Stephen, James C.: *See—*
Schlosser, Erich J.; and Stephen, James C., 5,490,452, Cl. 99-422.000.

Stephens, Donald E.: *See—*
Jones, Oliver D.; and Stephens, Donald E., 5,490,809, Cl. 451-60.000.

Stephens, Rocky C.; and Dutton, James C., to Lockheed Corporation. Flight simulator having active electronic display controls. 5,490,783, Cl. 434-35.000.

Sterner, Mark L.: *See—*
Jantschek, Robert J.; Rouser, Forrest J.; Sterner, Mark L.; and Testen, Theodore J., 5,490,808, Cl. 451-59.000.

Sterns, William G.: *See—*
Johnson, Robert E.; Charlton, Gregory G.; Sterns, William G.; and Cho, Ching-Fai, 5,491,489, Cl. 343-779.000.

Stevens, David J.; Mayer, Joseph B., Jr.; and Marchand, Kirk A., to Southwest Research Institute. Quick release system for guardrail terminals. 5,490,661, Cl. 256-13.100.

Stevens, John H., to Stanford Surgical Technologies, Inc. System for cardiac procedures. 5,490,833, Cl. 604-4.000.

Stevenson, Thomas M.: *See—*
Fahmy, Mohamed A. H.; Harrison, Charles R.; Lahm, George P.; and Stevenson, Thomas M., 5,491,162, Cl. 514-403.000.

Stewart, Douglas A.; Maule, Colin H.; and Molloy, James O., to Fisons, plc. Analytical device with variable angle of incidence. 5,491,556, Cl. 356-445.000.

Stewart, Robert C.: *See—*
Jain, Rakesh; Schleigh, William R.; and Stewart, Robert C., 5,491,054, Cl. 430-551.000.

Stewart, Thomas K.; and Hardt, Thomas T., to Compaq Computer Corporation. Aligned quick connect cover for a computer system. 5,491,611, Cl. 361-736.000.

St. Germain, Jon P.: *See—*
Blaeser, David J.; and St. Germain, Jon P., 5,490,837, Cl. 604-96.000.

Stine, Laurence O.; Hammershaimb, Harold U.; and Kocal, Joseph A., to UOP. Mixed-phase solid bed hydrocarbon alkylation process. 5,491,277, Cl. 585-719.000.

Stobbe, Anatoli. Access control system where the card controls the transmission format of the card reader. 5,491,471, Cl. 340-825.340.

Stojkovic, Dragan B.; and Justus, George L., to United Technologies Automotive, Inc. Slide actuated holding clamp. 5,490,663, Cl. 269-32.000.

Stoll, Kurt; and Lederer, Thomas, to Festo KG. Valve range. 5,490,385, Cl. 60-368.000.

Stone, Robert M., to Bishamon Industries Corporation. Pit-mounted load elevator. 5,490,758, Cl. 414-792.300.

Stoner, Brian R.: *See—*
Koyamao, Hisasi; Miyata, Koichi; Saito, Kimitsugu; Dreifus, David L.; and Stoner, Brian R., 5,491,348, Cl. 257-66.000.

Stork X-Cel B.V.: *See—*
Bibbe, Christiaan P. M.; Hester, Martinus J.; Prinsen, Wilhelmus J. C.; and van de Weyer, Fransiscus J. M., 5,491,499, Cl. 347-47.000.

Stoutenburgh, Roger R., to Associated Universities, Inc. Sealed vacuum canister and method for pick-up and containment of material. 5,491,345, Cl. 250-506.100.

Stowell, Davin B.; Ando, Mari H.; and Sica, Vanessa D., to General Housewares Corp. Teakettle. 5,490,616, Cl. 222-472.000.

Straeter, William F.: *See—*
Weder, Donald E.; and Straeter, William F., 5,490,352, Cl. 47-58.000.

Strandburg, Gary M.: *See—*
Klier, John; Strandburg, Gary M.; and Tucker, Christopher J., 5,490,948, Cl. 252-122.000.

Stratagene: *See—*
McKenzie, Douglas T.; and Sorge, Joseph A., 5,491,062, Cl. 435-6.000.

Stratasys, Inc.: *See—*
Batchelder, John S., 5,491,643, Cl. 364-512.000.

Strategic Weather Services: *See—*
Fox, Frederick D.; Pearson, Douglas R.; Rhoads, Mike A.; and Zaleski, Peter A., 5,491,629, Cl. 364-420.000.

Stratman, Daniel. Lifting apparatus. 5,490,757, Cl. 414-680.000.

Straub, Joseph: *See—*
Hogg, Neil; and Straub, Joseph, 5,490,391, Cl. 62-38.000.

Strauss, Wolfgang: *See—*
Dürschmidt, Ferry; and Strauss, Wolfgang, 5,490,414, Cl. 73-49.200.

Streetig, Jean, legal representative: *See—*
Streeting, Ian T., deceased; and Worthington, Paul A., 5,491,156, Cl. 514-367.000.

Streeting, Ian T., deceased (by Jean Streetig, legal representative); and Worthington, Paul A., to Zeneca Limited. Benzoxazole, benzothiazole and benzimidazole derivatives as fungicides. 5,491,156, Cl. 514-367.000.

Streit, Peter: *See—*
Bauer, Friedhelm; and Streit, Peter, 5,491,351, Cl. 257-152.000.

Stricklin, John D.; and Blanks, John B., to Seagate Technology, Inc. Rotary actuator vibration damper. 5,491,598, Cl. 360-106.000.

Strole, Norman C.: *See—*
Christensen, Kenneth J.; Siegel, Michael S.; Strole, Norman C.; and Zeisz, Raymond L., Jr., 5,491,687, Cl. 370-17.000.

Strong, Finn A., to Finn Strong Designs, Inc. Aquarium. 5,490,481, Cl. 119-259.000.

Stuart, Kyle H.; and Bervig, Dale R., to Tweco Products, Inc. Welding gun assembly. 5,491,321, Cl. 219-137.610.

Stuart, Warner H., to Bryce Corporation. Printing press cylinder assembly. 5,490,458, Cl. 101-375.000.

Stuber, Susan M.: *See—*
Allen, Robert R., deceased; Bruce, Richard H.; Chuang, Tzu-Chin; Fiske, Thomas G.; Fulks, Ronald T.; Hack, Michael; Ho, Jackson H.; Lewis, Alan G.; Martin, Russel A.; Silverstein, Louis D.; Steemers, Hugo L.; Stuber, Susan M.; Thompson, Malcolm J.; Turner, William D.; and Yao, William W., 5,491,347, Cl. 257-59.000.

Stucker, David S.: *See—*
Noble, Stephen W., Jr.; Williams, Norman E.; Stucker, David S.; Segebart, Robert L.; and Keaschall, Joseph W., 5,491,289, Cl. 800-200.000.

Stuk, Timothy L.; Allen, Michael S.; Haight, Anthony R.; Kerdesky, Francis A.; Langridge, Denton C.; Leanna, M. Robert; Lijewski, Linda M.; Melcher, Laura; Morton, Howard E.; Norbeck, Daniel W.; Reno, Daniel S.; Robbins, Timothy A.; Scarpetti, David; Sham, Hing L.; Sowin, Thomas J.; Tien, Jien-Heh J.; and Zhao, Chen, to Abbott Laboratories. Process for the preparation of a substituted 2,5-diamino-3-hydroxyhexane. 5,491,253, Cl. 560-27.000.

Stupian, Gary W.; and Leung, Martin S., to Aerospace Corporation, The. Hydrogen out venting electronic package. 5,491,361, Cl. 257-680.000.

Sturges, Jay, to Intel Corporation. Apparatus for configuring a subset of an integrated circuit having boundary scan circuitry connected in series and a method thereof. 5,491,666, Cl. 365-201.000.

Su, Hsin C.: *See—*
Cheng, Cheden; Huang, Shih S.; Ko, Tsung M.; and Su, Hsin C., 5,491,384, Cl. 315-169.300.

Suazon, Lamberta B., to Colgate-Palmolive Company. Liquid fabric softener compositions. 5,490,944, Cl. 252-8.800.

Subramanyam, Sundar: *See—*
Sawan, Samuel P.; Shalon, Tadmor; Subramanyam, Sundar; and Yurkovetskiy, Alexander, 5,490,938, Cl. 210-651.000.

Suenaga, Hiroharu: *See—*
Akizuki, Kenichiro; Suenaga, Hiroharu; and Hayashi, Masaki, 5,490,718, Cl. 297-452.490.

Suffi, Guerrino: *See—*
Cecchi, Marino; and Suffi, Guerrino, 5,491,462, Cl. 338-128.000.

Sugawara, Kazuaki; and Ito, Hideo, to Pioneer Electronic Corporation. Apparatus for and method of recording high resolution image, and apparatus for and method of reproducing the same. 5,491,560, Cl. 358-342.000.

Sugawara, Masayuki; and Mori, Toshihiro, to Mitsubishi Denki Kabushiki Kaisha. Laser cutting machine. 5,491,318, Cl. 219-121.670.

Sugimoto, Tadashi: *See—*
Umehara, Takafumi; Shimada, Eiji; and Sugimoto, Tadashi, 5,491,202, Cl. 525-438.000.

Sugioka, Katsuaki: *See—*
Akhavan-Tafti, Hashem; Desilva, Renuka; and Sugioka, Katsuaki, 5,491,072, Cl. 435-28.000.

Sugita, Naoki, to Kel Corporation. Multi-level memory card connector. 5,490,792, Cl. 439-159.000.

Sugiyama, Hisataka: *See—*
Maeda, Takeshi; Sugiyama, Hisataka; Sukeda, Hirofumi; and Wakabayashi, Kouichirou, 5,491,683, Cl. 369-124.000.

Sukeda, Hirofumi: *See—*
Maeda, Takeshi; Sugiyama, Hisataka; Sukeda, Hirofumi; and Wakabayashi, Kouichirou, 5,491,683, Cl. 369-124.000.

Sumitomo Electric Industries, Ltd.: *See—*
Yokota, Minoru; Nagata, Masayuki; Saito, Shigeo; and Yamada, Yuichi, 5,491,127, Cl. 505-433.000.

Sumitomo Rubber Industries, Ltd.: *See—*
Hamada, Akihiko; Koizumi, Yoshimasa; Hiraoka, Hidenori; and Yabuki, Yoshikazu, 5,490,674, Cl. 273-228.000.
Hiraoka, Hidenori, 5,490,673, Cl. 273-220.000.
Miyanaga, Yoshinobu; and Mishima, Kenji, 5,490,897, Cl. 156-415.000.

Sumitomo Wiring Systems, Ltd.: *See—*
Kobayashi, Makoto; Naitou, Tsutomu; and Kurata, Kazunori, 5,490,794, Cl. 439-212.000.
Murakami, Makoto; Noro, Michimasa; and Ito, Takao, 5,490,798, Cl. 439-310.000.
Okada, Hajime, 5,490,790, Cl. 439-141.000.
Sakai, Koji; and Shirata, Akio, 5,490,595, Cl. 206-408.000.

Sumitomo Wiring Systems Ltd (a corp. of Japan): *See—*
Kimoto, Koichi, 5,490,316, Cl. 29-564.400.

Sun Company, Inc. (R&M): *See—*
Angstadt, Howard P.; Hollstein, Elmer J.; and Hsu, Chao-Yang, 5,491,278, Cl. 585-731.000.

Sun, Gang: *See—*
Worley, Shelby D.; Sun, Gang; Sun, Wanying; and Chen, Tay-Yuan, 5,490,983, Cl. 424-405.000.

Sun, Wanying: *See—*

Worley, Shelby D.; Sun, Gang; Sun, Wanying; and Chen, Tay-Yuan, 5,490,983, Cl. 424-405.000.

Sunahata, Matsumi: *See—*
Ishino, Renshiro; Saito, Taro; and Sunahata, Matsumi, 5,491,369, Cl. 310-26.000.

Sunbeam Products, Inc.: *See—*
Giebel, Michael; Speck, Steven; and Love, Randy, 5,490,494, Cl. 126-41.00R.

Sundquist, Hannu K.: *See—*
Toivola, Reijo J.; Karjalainen, Arto J.; Kurkela, Kauko O. A.; Soderwall, Marja-Liisa; Kangas, Lauri V. M.; Blanco, Guillermo L.; Sundquist, Hannu K.; and Kalapudas, Arja, 5,491,173, Cl. 514-648.000.

Sundstrand Corporation: *See—*
Napier, James C.; and Thompson, Robert G., 5,491,308, Cl. 181-224.000.

Sung, Rodney L.: *See—*
Derosa, Thomas F.; Sung, Rodney L.; and Kaufman, Benjamin J., 5,491,256, Cl. 560-132.000.

Suni, Jouko; and Tammi, Tapio, to Polar Electro Oy. Telemetric transmitter unit. 5,491,474, Cl. 340-870.310.

Super Sack Manufacturing Corp.: *See—*
Derby, Norwin C., 5,490,828, Cl. 493-220.000.

Suran, Michael J.; and Trumbo, Michel, to Chrysler Corporation. Active seat belt control system with built in interia sensor. 5,490,575, Cl. 180-270.000.

Surko, Walter E., Jr., to International Security Products, Inc. Access control assembly. 5,490,697, Cl. 292-92.000.

Surprenant, Richard P.: *See—*
Economikos, Laertis; Hannon, Robert; and Surprenant, Richard P., 5,491,319, Cl. 219-121.690.

Sussmeier, John W., to United Parcel Service of America, Inc. Anamorphic lens system for a hand-held symbology reader. 5,491,346, Cl. 250-568.000.

Sutton, James E.: *See—*
Brust, Thomas B.; Gould, Sharon; Sutton, James E.; and Szajewski, Richard P., 5,491,050, Cl. 430-380.000.

Suyama, Takahiro: *See—*
Seki, Akinori; Hosoba, Hiroyuki; Hata, Toshio; Kondo, Masafumi; Suyama, Takahiro; and Matsui, Sadayoshi, 5,491,106, Cl. 437-107.000.

Suzuki, Fumio; and Sato, Shigemasa, to Nikon Corporation. Camera with device for detecting line of sight. 5,491,532, Cl. 354-410.000.

Suzuki, Katsutoshi, to Alps Electric Co., Ltd. Multi-way input device. 5,491,497, Cl. 345-157.000.

Suzuki, Mieko; Homma, Tetsuya; Murao, Yukinobu; Tanigawa, Takaho; and Koga, Hiroki, to NEC Corporation. Method of producing semiconductor integrated circuit device having interplayer insulating film covering substrate. 5,491,108, Cl. 437-192.000.

Suzuki, Mitsuo; Terashima, Isamu; and Kumada, Katsumi, to Hitachi, Ltd. Developing apparatus having developing agent accommodating cartridge and cartridge for accommodating developing agent for use in developing apparatus. 5,491,537, Cl. 355-245.000.

Suzuki, Mitsuyoshi, to Mitsubishi Denki Kabushiki Kaisha. Image coding/decoding apparatus for efficient processing by sharing members in coding/local decoding and decoding processing. 5,491,515, Cl. 348-401.000.

Suzuki, Takahiro; Kawamura, Sukezo; Toriyama, Motohiro; Yokokawa, Yoshiyuki; Kawamoto, Yukari; Hakamatsuka, Yasuharu; and Irie, Hiroyuki, to Director-General of Agency of Industrial Science and Technology; and Olympus Optical Co., Ltd. Plasminogen activator covalently bonded to a porous body of β-tricalcium phosphate. 5,491,082, Cl. 435-176.000.

Suzuki, Toshio; Saito, Asao; Shibata, Makoto; Kobayashi, Junichi; Komuro, Hirokazu; Mori, Toshihiro; Koyama, Shuji; Yokoyama, Sakai; Koizumi, Ryoichi; and Murakami, Keiichi, to Canon Kabushiki Kaisha. Ink jet recording head and apparatus having a protective member formed above energy generators for generating energy used to discharge ink. 5,491,505, Cl. 347-203.000.

Suzuki, Yoichi: *See—*
Amemiya, Shinichi; and Suzuki, Yoichi, 5,490,511, Cl. 128-660.010.

Suzuki, Yoshio: *See—*
Shirane, Yoshiyuki; Iwasa, Seiichi; Suzuki, Yoshio; Kuramochi, Kiyoshi; Kokubo, Kazuo; Ohno, Tetsuya; Mizuno, Kimio; and Satoh, Takashi, 5,491,631, Cl. 364-424.040.

Swanson, David W.; Carlin, Timothy J.; Kaplinsky, George T.; and Harmon, John P., to Hewlett-Packard Company. Thin pen structure for thermal ink-jet printer. 5,491,502, Cl. 347-87.000.

Swanson, Victor E.: *See—*
Feucht, Joel D.; Shoup, Stephen G.; and Swanson, Victor E., 5,490,762, Cl. 415-168.100.

Swart, David P.: *See—*
Goetschel, Christian J.; Greene, Robert A.; Kertis, Robert A.; Philpott, Rick A.; Richetta, Raymond A.; Schmerbeck, Timothy J.; Schulte, Donald J.; and Swart, David P., 5,491,441, Cl. 327-291.000.
Goetschel, Christian J.; Greene, Robert A.; Kertis, Robert A.; Philpott, Rick A.; Richetta, Raymond A.; Schmerbeck, Timothy J.; Schulte, Donald J.; and Swart, David P., 5,491,447, Cl. 330-254.000.

Swedo, Raymond J.; Green, George D.; and Snyder, James R., to AlliedSignal Inc. Hydrogen stabilizers for vinyl ether-based coating systems. 5,491,178, Cl. 522-74.000.

Sweeney, Patrick J.: *See—*
Burns, William S.; and Sweeney, Patrick J., 5,490,366, Cl. 52-713.000.

Sweet, M. Lynne: *See—*
Devine, Denise L.; Katz, Sheila M.; Salmon, Peter M.; and Sweet, M. Lynne, 5,490,997, Cl. 426-573.000.

Sweetheart Cup Company, Inc.: *See—*
Van de Geijn, Peter T.; Bealer, Kenneth H.; Earnest, Edward M.; Kuykendall, Kenneth H., Sr.; and Maccherone, Larry S., 5,490,827, Cl. 493-109.000.

Swenson, Rolf E.: *See—*
Haviv, Fortuna; Greer, Jonathan; Swenson, Rolf E.; and Sauer, Daryl R., 5,491,217, Cl. 530-313.000.

Swift, Graham: *See—*
Paik, Yi H.; Simon, Ethan S.; and Swift, Graham, 5,491,212, Cl. 528-363.000.

Swiszcz, Paul G.: *See—*
Colson, Wendell B.; Anderson, Richard N.; Swiszcz, Paul G.; and Throne, Jason T., 5,490,553, Cl. 160-84.060.

Syed, Ahmer R.: *See—*
Brandenburg, Scott D.; Murphy, William S.; Syed, Ahmer R.; King, David A.; and Yeh, Shing, 5,491,364, Cl. 257-786.000.

Symbios Logic Inc.: *See—*
Gasparik, Frank, 5,491,429, Cl. 326-27.000.

Symbiosis Corporation: *See—*
Kratsch, Peter K.; and Hahnen, Kevin F., 5,490,861, Cl. 606-205.000.

Syntex (U.S.A.) Inc.: *See—*
Berger, Jacob; and Clark, Robin D., 5,491,148, Cl. 514-305.000.

Synvasive Technology, Inc.: *See—*
Fisher, Michael G.; and Nemeth, Joe, 5,490,854, Cl. 606-88.000.

Szajewski, Richard P.: *See—*
Brust, Thomas B.; Gould, Sharon; Sutton, James E.; and Szajewski, Richard P., 5,491,050, Cl. 430-380.000.

Taborn, Michael P.; and Miller, Paul K., to International Business Machines Corporation. Differential carry-save adder and multiplier. 5,491,653, Cl. 364-784.000.

Tabota, Jun; Inoue, Jiro; and Unami, Toshihiko, to Murata Manufacturing Co., Ltd. Acceleration sensor. 5,490,422, Cl. 73-514.340.

Tacan Corporation: *See—*
Hu, Andong; and Bonnell, Douglas P., 5,491,764, Cl. 385-24.000.

Tadera, Takamitsu: *See—*
Yamamoto, Tatsushi; Kakiwaki, Sigeaki; Okuda, Tohru; Okada, Hideo; Tsuji, Masaji; Tadera, Takamitsu; and Yoshimoto, Akihito, 5,491,594, Cl. 360-73.040.

Tagawa, Takao; Nohno, Hitoshi; Nozaki, Kiyohiro; and Okamura, Kazunari, to Sharp Kabushiki Kaisha. Display-integrated type tablet device capable of detecting correct coordinates at a tip end of a detection pen by detecting external noise. 5,491,706, Cl. 371-57.200.

Taguchi, Kouji: *See—*
Kozawa, Hideaki; Kojima, Kazuo; Ono, Tomoyuki; Yanagawa, Hirofumi; Kitazume, Hideaki; and Taguchi, Kouji, 5,490,867, Cl. 29-623.200.

Tai, George. Method of making a semiconductor diode. 5,491,111, Cl. 437-209.000.

Taisho Pharmaceutical Co., Ltd.: *See—*
Sato, Fumie; Amano, Takehiro; Kameo, Kazuya; Tanami, Tohru; Mutoh, Masaru; Ono, Naoya; and Goto, Jun, 5,491,254, Cl. 560-121.000.

Taiwan Fu Hsing Industrial Co., Ltd.: *See—*
Shiue, Jiang-Lin, 5,490,695, Cl. 292-1.500.

Tajiri, Akihiro; Hotta, Yoshihiko; Ishikawa, Mitsuru; Sakuma, Choji; and Yuri, Nobuyuki, to Honda Giken Kogyo Kabushiki Kaisha. Battery temperature control system in electric automobile. 5,490,572, Cl. 180-65.100.

Takagawa, Makoto: *See—*
Morikawa, Shuichi; Futatsuka, Masahiko; Ishida, Satoshi; Miyauchi, Yasunori; Masuda, Minoru; and Takagawa, Makoto, 5,491,567, Cl. 358-498.000.

Takahashi, Hideroh: *See—*
Shiga, Tohru; Okada, Akane; Takahashi, Hideroh; and Kurauchi, Toshio, 5,490,426, Cl. 73-762.000.

Takahashi, Naohiko; Hiroshima, Minoru; Matsushita, Osami; and Fukushima, Yasuo, to Hitachi, Ltd. Magnetic bearing apparatus and rotating machine having such an apparatus. 5,491,396, Cl. 318-632.000.

Takahiro, Douke: *See—*
Nobuyuki, Yamada; Takahiro, Douke; and Hidetoshi, Tsuji, 5,491,388, Cl. 315-308.000.

Takahisa, Tsutomu; Iida, Motohisa; and Allen, Lucille, to Digital D.J. Inc. Broadcast system with associated data capabilities. 5,491,838, Cl. 455-66.000.

Takase, Makoto: *See—*
Yokoyama, Tomoaki; and Takase, Makoto, 5,491,541, Cl. 355-251.000.

Takatani, Setsuo; and Sakai, Hiroshi, to Colin Corporation. Peripheral blood flow evaluating apparatus. 5,490,506, Cl. 128-633.000.

Takato, Hideyasu; and Shimizu, Seiji, to Olympus Optical Co., Ltd. Real image mode finder optical system having an objective lens integrated as a prism with a reflective surface. 5,491,528, Cl. 354-225.000.

Takeda Chemical Industries, Ltd.: *See—*
Miyake, Akio; Kawano, Yasuhiko; and Ashida, Yasuko, 5,491,145, Cl. 514-248.000.

Takeuchi, Makoto: *See—*
Nakagawa, Yoshinori; Kimoto, Tetsuo; and Takeuchi, Makoto, 5,491,151, Cl. 514-311.000.

Takigen Manufacturing Co. Ltd.: *See—*
Yamada, Kenichi, 5,490,404, Cl. 70-210.000.

Takizawa, Yoshinori: *See—*

Nagao, Kagenori; Takizawa, Yoshinori; and Matsumoto, Naoko, 5,491,759, Cl. 382-199.000.
Talacko, Oldřich: *See—*
Špindler, Zdeněk; Burýšek, František; Němec, Jiří; Novotný, Vojtěch; Lásko, Josef; Blasel, Miroslav; and Talacko, Oldřich, 5,490,375, Cl. 57-263.000.
Taligent, Inc.: *See—*
Goldsmith, Amy M.; Goldsmith, David B.; and Pettus, Christopher E., 5,491,800, Cl. 395-200.120.
Talus Corporation: *See—*
McConnell, Michael P., 5,490,623, Cl. 224-275.000.
Tammi, Tapio: *See—*
Suni, Jouko; and Tammi, Tapio, 5,491,474, Cl. 340-870.310.
Tan, Michael R. T.: *See—*
Lin, Hong; Yang, Long; Tan, Michael R. T.; and Wang, Shih-Yuan, 5,491,712, Cl. 372-50.000.
Tanaglia, Tiziano; Banzi, Viviano; and Zecchi, Elisa, to Enichem Elastomeri S.r.l. Ethylene-propylene elastomeric copolymers with a low content of residual chlorine. 5,491,208, Cl. 526-143.000.
Tanaka, Eiji; Urata, Hisao; and Oshiki, Toshiyuki, to Mitsubishi Chemical Corporation. Method for oligomerizing an alpha-olefin. 5,491,272, Cl. 585-520.000.
Tanaka, Hironori: *See—*
Itakura, Keijirou; Nobusada, Toshihide; Toyoda, Yasuyuki; Saitoh, Yukio; Kokusenya, Noboru; Nagayoshi, Ryouichi; Tanaka, Hironori; and Ozaki, Masayoshi, 5,491,512, Cl. 348-321.000.
Tanami, Tohru: *See—*
Sato, Fumie; Amano, Takehiro; Kameo, Kazuya; Tanami, Tohru; Mutoh, Masaru; Ono, Naoya; and Goto, Jun, 5,491,254, Cl. 560-121.000.
Tandem Computers Incorporated: *See—*
Mirov, Russell N.; Le, Duc N.; Mikalauskas, Frank; Grebenkemper, C. John; and Kwan, Kinying, 5,491,442, Cl. 327-295.000.
Tanifuji, Naoki: *See—*
Nozawa, Takahiro; Nishizawa, Yukio; and Tanifuji, Naoki, 5,491,520, Cl. 348-625.000.
Tanigawa, Takaho: *See—*
Suzuki, Mieko; Homma, Tetsuya; Murao, Yukinobu; Tanigawa, Takaho; and Koga, Hiroki, 5,491,108, Cl. 437-192.000.
Taniguchi, Akihiko: *See—*
Mashiba, Tamaki; and Taniguchi, Akihiko, 5,491,536, Cl. 355-208.000.
Tanii Indusries Co., Ltd.: *See—*
Tanii, Masao, 5,490,928, Cl. 210-380.300.
Tanii, Masao, to Tanii Indusries Co., Ltd. Tandem waterwheel trommel. 5,490,928, Cl. 210-380.300.
Tanikake, Makoto; Morinaga, Yoshiki; Shirai, Katsuhiko; and Shimada, Masanori, to Daihatsu Motor Co., Ltd. Two-cycle internal combustion engine. 5,490,483, Cl. 123-65.00P.
Tannenbaum, Steven: *See—*
Benjamin, Thomas L.; Chen-Wu, Joan; Hansen, Thomsen; Jackson, Barbara; Livingston, David; Tannenbaum, Steven; and Wogan, Gerald, 5,491,068, Cl. 435-7.320.
TAP Holding Inc.: *See—*
Haviv, Fortuna; Greer, Jonathan; Swenson, Rolf E.; and Sauer, Daryl R., 5,491,217, Cl. 530-313.000.
Tarbell, James V.: *See—*
Rennie, Foster W.; Chao, Tze; Eastham, Donald H.; and Tarbell, James V., 5,490,976, Cl. 423-658.500.
Tardif, Pierre, to Trudeau, Genin. Commuter mug and holder assembly. 5,490,622, Cl. 224-556.000.
Tastemaker: *See—*
Robinson, James R.; and Sims, Marc J., 5,490,884, Cl. 95-45.000.
Tauster, Samuel J.: *See—*
Wan, Chung-Zong; Tauster, Samuel J.; and Rabinowitz, Harold N., 5,490,977, Cl. 423-210.000.
Tawil, Fady: *See—*
Settles, Steven R.; and Tawil, Fady, 5,491,404, Cl. 323-283.000.
Taylor, Kenneth D., to Apex Engineering Company. Method and apparatus for welding ventilation. 5,491,320, Cl. 219-137.410.
Taylor, Nicholas J.: *See—*
Earle, Anthony; Graebe, Christopher M.; Glover, Edward C. T. S.; Skye, David A.; Taylor, Nicholas J.; and Ward, Paul C., 5,491,530, Cl. 354-313.000.
Taylor, R. Gregory; and Morice, Larry F., to Clorox Company, The. Viscous fluid dispenser. 5,490,613, Cl. 222-102.000.
Taylor, Todd A.: *See—*
Kenny, Jonathan E.; and Taylor, Todd A., 5,491,344, Cl. 250-461.100.
Taylor, Wayne H., to Trent Metals Limited. Housing for a heat recovery ventilator with fans hingedly mounted to housing. 5,490,557, Cl. 165-54.000.
TCSI Corp.: *See—*
Cheng, Jong-Keung; Lin, Nan-Sheng; and Touriguian, Mihran H., 5,491,726, Cl. 375-343.000.
Tech-Line Engineering Co.: *See—*
Schleicher, Louis C., 5,490,310, Cl. 29-243.500.
Teel, Thomas A., to SGS-Thomson Microelectronics, Inc. Pre-charged slave latch with parallel previous state memory. 5,491,663, Cl. 365-189.050.
Teichman, Gary A.: *See—*
Bahr, Allen A.; Nguyen, Du V.; and Teichman, Gary A., 5,491,391, Cl. 318-39.000.
Tektronix, Inc.: *See—*
Bell, Florian G.; Trent, William A.; and Lopez, Alexander R., 5,491,548, Cl. 356-73.100.
Teledyne Industries, Inc.: *See—*
Kerdiya, Nidal; and Andes, Richard L., 5,491,419, Cl. 324-418.000.
Telefonaktiebolaget LM Ericsson: *See—*
Naper, Hans P., 5,491,565, Cl. 358-468.000.
Sellin, Patrik C.; Fall, Örjan P. S.; Molin, Anders K.; and Wilhelmsson, Lars J., 5,491,719, Cl. 375-213.000.
Telemecanique: *See—*
Heissat, Jean-Marc; and Lacour, Jean-Marc, 5,490,601, Cl. 212-275.000.
TelePad: *See—*
Dankman, Scott; and Lastinger, Roc A., 5,491,609, Cl. 361-686.000.
Teltsch, Giora J.: *See—*
Inbar, Dan; and Teltsch, Giora J., 5,491,332, Cl. 250-221.000.
Telyan, Norayr G.: *See—*
Kasat, Radhakrishna B.; Lee, Wilson; McCarthy, David R.; and Telyan, Norayr G., 5,490,979, Cl. 424-66.000.
Tenerowicz, Ronald J.: *See—*
Mann, Jeffrey S.; Shea, John F.; and Tenerowicz, Ronald J., 5,490,774, Cl. 431-154.000.
Terashima, Isamu: *See—*
Suzuki, Mitsuo; Terashima, Isamu; and Kumada, Katsumi, 5,491,537, Cl. 355-245.000.
Terashima, Yuji; Haruguchi, Takashi; Ohwaki, Hirohiko; and Soeda, Yoshinobu, to Matsushita Electric Industrial Co., Ltd. Optical disk unit. 5,491,684, Cl. 369-219.000.
Terauchi, Kiyoshi: *See—*
Kanou, Hiroshi; Terauchi, Kiyoshi; Fukai, Isamu; and Ogura, Toshiyuki, 5,490,767, Cl. 417-222.100.
Tesch, Richard E.: *See—*
Desai, Vinod; and Tesch, Richard E., 5,490,364, Cl. 52-637.000.
Tessera, Inc.: *See—*
Distefano, Thomas H.; Kovac, Zlata; and Grange, John, 5,491,302, Cl. 114-260.000.
Testen, Theodore J.: *See—*
Jantschek, Robert J.; Rouser, Forrest J.; Sterner, Mark L.; and Testen, Theodore J., 5,490,808, Cl. 451-59.000.
Texaco Inc.: *See—*
Derosa, Thomas F.; Sung, Rodney L.; and Kaufman, Benjamin J., 5,491,256, Cl. 560-132.000.
Herbstman, Sheldon; Love, Doris; Petrus, Michael P.; and Migdal, Cyril A., 5,490,864, Cl. 44-379.000.
Meek, Thomas D., 5,490,918, Cl. 208-131.000.
O'Young, Chi-Lin; Pellet, Regis J.; Hadowanetz, Alison E.; Hazen, John; and Browne, James E., 5,491,276, Cl. 585-671.000.
Texas A&M University System, The: *See—*
Carrington, James C.; and Dolja, Valerian V., 5,491,076, Cl. 435-70.100.
Texas Instruments Deutschland GmbH: *See—*
Flaxl, Thomas J., 5,491,715, Cl. 375-344.000.
Texas Instruments Incorporated: *See—*
Ashmore, Benjamin H., Jr., 5,491,660, Cl. 365-230.020.
Coffman, Tim M.; Lin, Sung-Wei; and Reddy, T. Damodar, 5,491,809, Cl. 395-430.000.
D'Hont, Loek J., 5,491,483, Cl. 342-42.000.
Gove, Robert J., 5,491,510, Cl. 348-77.000.
Hynecek, Jaroslav, 5,491,354, Cl. 257-239.000.
Kao, Yung-Chung; and Celii, Francis G., 5,490,880, Cl. 118-665.000.
Kay, Michael R.; and Thiel, Frank L., V, 5,491,456, Cl. 331-57.000.
Levine, Jules D.; Shen, Chi-Cheong; and Gnade, Bruce E., 5,491,376, Cl. 313-495.000.
Nasserbakht, Mitra, 5,491,431, Cl. 326-38.000.
Pauli, Giles A., 5,491,680, Cl. 369-112.000.
Rincon, Gabriel A.; Salamina, Nicolas; and Corsi, Marco, 5,491,437, Cl. 327-108.000.
Schreck, John F.; and Truong, Phat C., 5,491,658, Cl. 365-185.160.
Schuermann, Josef H., 5,491,484, Cl. 342-51.000.
Smayling, Michael C.; Torreno, Manuel L., deceased , Jr; and Falessi, Georges, 5,491,105, Cl. 437-54.000.
Textronix, Inc.: *See—*
Grellman, H. Erwin, 5,491,504, Cl. 347-176.000.
Th. Goldschmidt AG: *See—*
Grüning, Burghard; and Weitemeyer, Christian, 5,491,245, Cl. 554-68.000.
Thacker, James R.; Weinberg, Alvin H.; and Moaddeb, Shahram, to Pacesetter, Inc. Method for making a body implantable sensor. 5,490,323, Cl. 29-625.000.
Thayer, Dale D.: *See—*
Yarnall, Ransom A.; Axford, J. Paul; and Thayer, Dale D., 5,491,737, Cl. 378-58.000.
Thera Patent GmbH & Co. KG Gesellschaft Für Industrielle Schutzrechte: *See—*
Hahn, Rainer; and Burger, Bernd, 5,490,810, Cl. 451-165.000.
ThermoSpectra Corporation: *See—*
Yarnall, Ransom A.; Axford, J. Paul; and Thayer, Dale D., 5,491,737, Cl. 378-58.000.
Theroux, Marc J.: *See—*
Person, Wayne C.; Theroux, Marc J.; Azarbarzin, Kurt; and Granger, Richard N., 5,490,856, Cl. 606-139.000.
Thiel, Frank L., V: *See—*
Kay, Michael R.; and Thiel, Frank L., V, 5,491,456, Cl. 331-57.000.

Thiele, Charles W.; Willemstyn, Tunis J.; Arndt, Douglas J.; and McMullen, John J., to Motan, Inc. Device for metering and entraining a product into a gas stream. 5,490,745, Cl. 406-132.000.

Thiele, Siegfried; and Tweer, Rolf, to Wilhelm Altendorf GmbH & Co. KG. Pivotable stop for machine tools. 5,490,665, Cl. 269-303.000.

Thomas, Brian: *See*—
Van Meter, James P.; Bagchi, Pranab; Thomas, Brian; and Rosiek, Thomas A., 5,491,052, Cl. 430-545.000.

Thomas, Charles P.: *See*—
Bala, Gregory A.; and Thomas, Charles P., 5,490,531, Cl. 134-109.000.

Thomas, Jerry C.: *See*—
Glowny, David A.; Kistenmacher, John C.; Rahn, Caryl M.; and Thomas, Jerry C., 5,491,791, Cl. 395-183.130.

Thomas, Matthew M.: *See*—
Wise, Gordon A.; Saunders, Roger N.; Thomas, Matthew M.; Maynard, Raymond W.; and Mangrum, Ronald W., 5,490,401, Cl. 68-198.000.

Thompson, Malcolm J.: *See*—
Allen, Robert R., deceased; Bruce, Richard H.; Chuang, Tzu-Chin; Fiske, Thomas G.; Fulks, Ronald T.; Hack, Michael; Ho, Jackson H.; Lewis, Alan G.; Martin, Russel A.; Silverstein, Louis D.; Steemers, Hugo L.; Stuber, Susan M.; Thompson, Malcolm J.; Turner, William D.; and Yao, William W., 5,491,347, Cl. 257-59.000.

Thompson, Michael I.; Congdon, Paul T.; Burnett, John L.; Fiduccia, Frank, deceased (by Julie W. Wu, Rachel Elyse Fiduccia, hiers), to Hewlett-Packard Company. Network adapter for inserting pad bytes into packet link headers based on destination service access point fields for efficient memory transfer. 5,491,802, Cl. 395-200.180.

Thompson, Phillip F.; Finck, Howard D.; Sheppard, Donald K.; and DeHetre, Gregory G., to Qwest Communications. Schedulable automatically configured video conferencing system. 5,491,797, Cl. 395-200.030.

Thompson, Robert G.: *See*—
Napier, James C.; and Thompson, Robert G., 5,491,308, Cl. 181-224.000.

Thomson Consumer Electronics, Inc.: *See*—
Fernsler, Ronald E.; and Williams, Kevin M., 5,491,389, Cl. 315-371.000.

Thomson Consumer Electronics S.A.: *See*—
Boie, Werner; Bolender, Nadine; and Chevet, Jean-Claude, 5,491,521, Cl. 348-626.000.
Wu, Chun H., 5,491,794, Cl. 395-182.210.

Thomson-CSF: *See*—
Jano, Patrice; and Rat, Sylvie, 5,490,643, Cl. 244-3.110.

Thomson, Robert T.: *See*—
Chin, Arthur A.; Collins, Nick A.; Harandi, Mohsen N.; Thomson, Robert T.; and Ware, Robert A., 5,491,270, Cl. 585-467.000.

Thorson, Eric K.: *See*—
McCaul, Bruce W.; Doggett, David E.; and Thorson, Eric K., 5,491,341, Cl. 250-343.000.

Throne, Jason T.: *See*—
Colson, Wendell B.; Anderson, Richard N.; Swiszcz, Paul G.; and Throne, Jason T., 5,490,553, Cl. 160-84.060.

TI Matrix Engineering Limited: *See*—
Anderson, Peter; and Inglis, Stuart J., 5,490,583, Cl. 188-161.000.

Tidland Corporation: *See*—
Miller, William R.; Becker, Timothy J.; and Olson, John E., 5,490,640, Cl. 242-571.600.

Tiemann, Jerome J.: *See*—
Welles, Kenneth B., II; Tiemann, Jerome J.; and Tomlinson, Harold W., Jr., 5,491,486, Cl. 342-357.000.

Tien, Jien-Heh J.: *See*—
Stuk, Timothy L.; Allen, Michael S.; Haight, Anthony R.; Kerdesky, Francis A.; Langridge, Denton C.; Leanna, M. Robert; Lijewski, Linda M.; Melcher, Laura; Morton, Howard E.; Norbeck, Daniel W.; Reno, Daniel S.; Robbins, Timothy A.; Scarpetti, David; Sharn, Hing L.; Sowin, Thomas J.; Tien, Jien-Heh J.; and Zhao, Chen, 5,491,253, Cl. 560-27.000.

Timex Corporation: *See*—
Daigle, Lyman R.; Ledesma, Andrew C.; and Ang, Sotero A., 5,491,379, Cl. 313-509.000.

Tingler, Kenneth L.: *See*—
DeCory, John F.; James, Robert O.; Tingler, Kenneth L.; and Wexler, Ronald M., 5,491,051, Cl. 430-496.000.

Tinti, Maria O.: *See*—
Giannessi, Fabio; Castagnani, Roberto; Tinti, Maria O.; De Angelis, Francesco; De Witt, Paolo; and Misiti, Domenico, 5,491,260, Cl. 562-567.000.

Tiret, Etienne: *See*—
Bonniot, Claude; Vuillamy, Didier; Desclos, Pierre; Tiret, Etienne; and Beaurain, André, 5,490,629, Cl. 239-265.150.

Tirosh, Ehud: *See*—
Kreitman, Haim; Bar-El, Dan; Amir, Yoel; and Tirosh, Ehud, 5,491,517, Cl. 348-581.000.

Tisserand, Georges; and Tisserand, Jacques, to Idmatics S.A. Device for the pre-sealing of a document to a plastic band. 5,490,899, Cl. 156-552.000.

Tisserand, Jacques: *See*—
Tisserand, Georges; and Tisserand, Jacques, 5,490,899, Cl. 156-552.000.

Todt, Gregory L., to Transhield, Inc. Shrink wrap material and method for protecting articles. 5,491,017, Cl. 428-198.000.

Togano, Norio. Shift lever apparatus. 5,490,585, Cl. 192-4.00A.

Togawa, Tsuyoshi, to Olympus Optical Co., Ltd. Information recording and/or reproducing apparatus with shutter member and shuttle linked for movement together. 5,491,679, Cl. 369-77.200.

Tohidi, Fred F. Long multi-position microphone support stand. 5,490,599, Cl. 211-171.000.

Toho Serofan Company Limited: *See*—
Yamamoto, Tomoaki; and Andou, Manabu, 5,490,541, Cl. 138-118.100.

Toivola, Reijo J.; Karjalainen, Arto J.; Kurkela, Kauko O. A.; Soderwall, Marja-Liisa; Kangas, Lauri V. M.; Blanco, Guillermo L.; Sundquist, Hannu K.; and Kalapudas, Arja, to Orion-yhtymä Oy. Tri-phenyl alkene derivatives and their preparation and use. 5,491,173, Cl. 514-648.000.

Tokiwa, Toru; and Hasegawa, Takayoshi, to Amada Company, Limited. Bar storage apparatus. 5,490,752, Cl. 414-280.000.

Tolliver, Howard R.; and Bailey, Terry R., to Minnesota Mining and Manufacturing Company. Truck trailer cover having a high strength non-chlorinated multi-layered polymeric article. 5,491,021, Cl. 428-217.000.

Toltzman, Douglas: *See*—
Allen, Wade C.; Goodwin, Jeremy P.; Nielsen, Robert L.; Reder, Paul J.; and Toltzman, Douglas, 5,491,822, Cl. 395-700.000.

Tomida, Yasuko: *See*—
Yamamoto, Nobuko; Tomida, Yasuko; Ohyama, Junji; Nomoto, Tsuyoshi; and Kawaguchi, Masahiro, 5,491,093, Cl. 436-71.000.

Tomiyasu, Yuichi, to Kabushiki Kaisha Toshiba. Display control device for use with flat-panel display and color CRT display. 5,491,496, Cl. 345-147.000.

Tomlinson, Harold W., Jr.: *See*—
Welles, Kenneth B., II; Tiemann, Jerome J.; and Tomlinson, Harold W., Jr., 5,491,486, Cl. 342-357.000.

Tomoe Technical Research Company: *See*—
Kamezawa, Jiro, 5,490,660, Cl. 251-96.000.

Ton-That, Giao M.: *See*—
Levran, Alexander; Nowosielski, Joseph M.; Ton-That, Giao M.; Rajagopalan, Ramamoorthy; and Mabboux, Henri, 5,491,624, Cl. 363-87.000.

Toomarian, Nikzad: *See*—
Barhen, Jacob; Toomarian, Nikzad; Fijany, Amir; and Zak, Michail, 5,491,650, Cl. 364-606.000.

Topala, George: *See*—
Niemann, James A.; and Topala, George, 5,490,325, Cl. 29-846.000.

Toppan Printing Co., Ltd.: *See*—
Maro, Hideharu; Kodaira, Hideki; Iwase, Hiroshi; and Komiya, Yuji, 5,491,018, Cl. 428-200.000.

Toriyama, Motohiro: *See*—
Suzuki, Takahiro; Kawamura, Sukezo; Toriyama, Motohiro; Yokokawa, Yoshiyuki; Kawamoto, Yukari; Hakamatsuka, Yasuharu; and Irie, Hiroyuki, 5,491,082, Cl. 435-176.000.

Tornes, Jan: *See*—
Warner, Donald B.; Andrews, John T.; Menke, Mark D.; Cooperman, Marc A.; and Tornes, Jan, 5,490,581, Cl. 187-414.000.

Torreno, Arlene, executrix: *See*—
Smayling, Michael C.; Torreno, Manuel L., deceased , Jr; and Falessi, Georges, 5,491,105, Cl. 437-54.000.

Torreno, Manuel L., deceased (by Arlene Torreno, executrix), Jr: *See*—
Smayling, Michael C.; Torreno, Manuel L., deceased , Jr; and Falessi, Georges, 5,491,105, Cl. 437-54.000.

Torres, James: *See*—
Raj, Kuldip; Torres, James; and Lanphear, Susan, 5,490,425, Cl. 73-745.000.

Torres, Robert J.: *See*—
Douglas, Thomas B.; and Torres, Robert J., 5,491,783, Cl. 395-159.000.
Douglas, Thomas B.; and Torres, Robert J., 5,491,784, Cl. 395-159.000.
King, Chen D.; Lee, Raymond E.; Scannell, Peter; and Torres, Robert J., 5,491,782, Cl. 395-159.000.

Toshiba Battery Co., Ltd.: *See*—
Kozawa, Hideaki; Kojima, Kazuo; Ono, Tomoyuki; Yanagawa, Hirofumi; Kitazume, Hideaki; and Taguchi, Kouji, 5,490,867, Cl. 29-623.200.

Total Containment, Inc.: *See*—
Webb, Michael C., 5,490,419, Cl. 73-40.50R.

Total Tool, Inc.: *See*—
Baker, Dwight, 5,490,565, Cl. 166-379.000.

Totani, Hideo. Safety system for occupant of an automotive vehicle. 5,490,706, Cl. 296-68.100.

Tóth, László: *See*—
Joó, Gábor; and Tóth, László, 5,491,008, Cl. 428-34.200.

Toto Ltd.: *See*—
Nobuyuki, Yamada; Takahiro, Douke; and Hidetoshi, Tsuji, 5,491,388, Cl. 315-308.000.

Touriguian, Mihran H.: *See*—
Cheng, Jong-Keung; Lin, Nan-Sheng; and Touriguian, Mihran H., 5,491,726, Cl. 375-343.000.

Toyoda, Yasuyuki: *See*—
Itakura, Keijirou; Nobusada, Toshihide; Toyoda, Yasuyuki; Saitoh, Yukio; Kokusenya, Noboru; Nagayoshi, Ryouichi; Tanaka, Hironori; and Ozaki, Masayoshi, 5,491,512, Cl. 348-321.000.

Toyoguchi, Yoshinori: *See*—
Hasegawa, Masaki; Bito, Yasuhiko; Ito, Shuji; Murai, Hiroyuki; and Toyoguchi, Yoshinori, 5,490,320, Cl. 29-623.100.

Toyokawa, Tetsune: *See*—
Aramaki, Matsumi; Isobe, Yasukazu; and Toyokawa, Tetsune, 5,491,789, Cl. 395-183.010.

Toyooka, Takehiro: *See—*
Mazaki, Hitoshi; Toyooka, Takehiro; and Itoh, Hiroyuki, 5,491,001, Cl. 427-162.000.

Toyota Jidosha Kabushiki Kaisha: *See—*
Akizuki, Kenichiro; Suenaga, Hiroharu; and Hayashi, Masaki, 5,490,718, Cl. 297-452.490.

Tracy, Lawrence R.; Eggers, Frederick W.; Houston, David; Wallace, Walter B.; and Bamford, Jeffrey, to C & K Systems, Inc. Location independent intrusion detection system. 5,491,467, Cl. 340-522.000.

Transhield, Inc.: *See—*
Todt, Gregory L., 5,491,017, Cl. 428-198.000.

Traxler, Peter: *See—*
Trinks, Uwe; and Traxler, Peter, 5,491,144, Cl. 514-245.000.

Tremel, Jean-Yves; Garandel, René; and Jan, Yves, to France Telecom. Method and device for measurement of performance parameters of an asynchronous transfer mode transmission network. 5,491,697, Cl. 371-5.100.

Treni Metals Limited: *See—*
Taylor, Wayne H., 5,490,557, Cl. 165-54.000.

Trent, William A.: *See—*
Bell, Florian G.; Trent, William A.; and Lopez, Alexander R., 5,491,548, Cl. 356-73.100.

Tri/West Systems, Inc.: *See—*
Volk, John F.; and Michaels, Thomas, 5,490,842, Cl. 604-110.000.

Trinks, Uwe; and Traxler, Peter, to Ciba-Geigy Corporation. Substituted diaminophthalimides and analogues. 5,491,144, Cl. 514-245.000.

Trionix Research Laboratory, Inc.: *See—*
Lim, Chun B.; Kline, Barry D.; Jiang, Jinghua J.; and Rappoport, Vitaliy, 5,491,342, Cl. 250-363.090.

Troncoso, Vincent F., to Golden Key Futura, Inc. Archery arrow rest assembly with adjustable angle and tension capability. 5,490,491, Cl. 124-44.500.

Trowbridge, Gerald D. Locking chock for tandem wheeled vehicles. 5,490,582, Cl. 188-2.00R.

Trudeau, Genin: *See—*
Tardif, Pierre, 5,490,622, Cl. 224-556.000.

Trumbo, Michel: *See—*
Suran, Michael J.; and Trumbo, Michel, 5,490,575, Cl. 180-270.000.

Truong, Phat C.: *See—*
Schreck, John F.; and Truong, Phat C., 5,491,658, Cl. 365-185.160.

Trustees of Boston University: *See—*
Sarin, Vinod K.; and Arya, Shish P. S., 5,491,028, Cl. 428-408.000.

Trustees of Columbia University in the City of New York, The: *See—*
Chalfie, Martin; and Prasher, Douglas, 5,491,084, Cl. 435-189.000.

TRW Inc.: *See—*
Kei Lau, James C.; Malmgren, Richard P.; and DePace, Ronald A., 5,491,304, Cl. 174-264.000.
Wang, Mansheng; and Given, Bruce A., 5,490,895, Cl. 156-286.000.

TRW Vehicle Safety Systems Inc.: *See—*
Mihm, Joseph J., 5,490,690, Cl. 280-728.200.

Tsai, Mingliang L.; and Balloni, Riccardo, to Mobil Oil Corporation. Film composition. 5,491,023, Cl. 428-349.000.

Tsu, Ming C.: *See—*
Hwang, Wen I.; and Tsu, Ming C., 5,490,338, Cl. 36-137.000.

Tsuchiya, Yutaka: *See—*
Urakami, Tsuneyuki; and Tsuchiya, Yutaka, 5,491,329, Cl. 250-205.000.

Tsuji, Masaji: *See—*
Yamamoto, Tatsushi; Kakiwaki, Sigeaki; Okuda, Tohru; Okada, Hideo; Tsuji, Masaji; Tadera, Takamitsu; and Yoshimoto, Akihito, 5,491,594, Cl. 360-73.040.

Tsuji, Nobuaki H., to Yamaha Corporation. Semiconductor device having peripheral metal wiring. 5,491,352, Cl. 257-207.000.

Tsurumaru, Yohka: *See—*
Miyabe, Kanji; Orita, Nobuhiro; Iwasaki, Makoto; Tsurumaru, Yohka; and Nakahara, Toshitsugu, 5,490,941, Cl. 210-673.000.

Tucker, Charles E.: *See—*
Allen, Diane E.; Tucker, Charles E.; Hobbs, Charles C.; and Chidambaram, Ramakrishnan, 5,491,265, Cl. 568-347.000.

Tucker, Christopher J.: *See—*
Klier, John; Strandburg, Gary M.; and Tucker, Christopher J., 5,490,948, Cl. 252-122.000.

Tufts University: *See—*
Kenny, Jonathan E.; and Taylor, Todd A., 5,491,344, Cl. 250-461.100.

Tulip Memory Systems, Inc.: *See—*
Nelson, Carl W.; and Weir, Richard D., 5,490,910, Cl. 204-192.150.

Turbiak-Magnotti, Frances: *See—*
Coyne, James C.; LaGrotta, Richard T.; Magnotti, Frank A.; and Turbiak-Magnotti, Frances, 5,490,436, Cl. 74-573.00F.

Turetta, Daniele, to Whirlpool Europe B.V. Device for detecting the presence of a food container, such as a saucepan, dish or the like, on a glass ceramic cooking hob. 5,491,423, Cl. 324-663.000.

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Stuart, Kyle H.; and Bervig, Dale R., 5,491,321, Cl. 219-137.610.

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Thiele, Siegfried; and Tweer, Rolf, 5,490,665, Cl. 269-303.000.

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Jones, Ralph W.; Wideman, Catherine C.; and Twombly, Paul W., 5,491,058, Cl. 430-596.000.

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Lin, Ching-Hua, 5,490,357, Cl. 52-220.700.

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Nishimura, Ken-ichi; Yoshimi, Akihisa; Mori, Takayoshi; Kakeya, Nobuharu; Kikuchi, Masahiro; Kondoh, Nobuo; Uchida, Takeshi; and Yamanouchi, Koichi, 5,491,171, Cl. 514-558.000.

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Uehara, Takafumi; and Dehara, Masayoshi, to Ando Electric Co., Ltd. Automatic clock duty cycle adjusting circuit. 5,491,440, Cl. 327-172.000.

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Doose, Ingolf, 5,490,407, Cl. 72-57.000.

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Heeger, Alan J.; and Smith, Paul, 5,491,027, Cl. 428-401.000.

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Roeder, G. R. Konrad, 5,491,745, Cl. 379-355.000.

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Babin, James E.; and Whiteker, Gregory T., 5,491,266, Cl. 568-449.000.

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Kataoka, Masaaki; Wakai, Akira; and Nakamura, Takehiko, 5,491,168, Cl. 514-517.000.

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Hashemi, Seyed H., 5,491,787, Cl. 395-182.090.

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Hsu, Chen-Chung, 5,491,099, Cl. 437-35.000.
Luo, Wenzhe; and Xu, Jiasheng, 5,491,652, Cl. 364-726.000.

United Parcel Service of America, Inc.: *See—*
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Cardoso-Neto, Joao E.; and Williams, Daniel W., 5,490,561, Cl. 166-264.000.

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Blough, Herbert A., 5,491,135, Cl. 514-115.000.

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Air Force: *See—*
O'Meara, Thomas R., 5,491,580, Cl. 359-247.000.
Pradhan, Dhiraj K.; and Vaidya, Nitin H., 5,491,705, Cl. 371-43.000.
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Leupold, Herbert A., 5,491,459, Cl. 335-306.000.
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Malone, Kevin J.; Hayden, Joseph S.; Sanford, Norman A.; and Aust, John A., 5,491,708, Cl. 372-41.000.
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Makowiecki, Daniel M.; and Holt, Joseph B., 5,490,911, Cl. 204-192.150.
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Laborda, Jorge, 5,491,061, Cl. 435-6.000.
Lichy, Jack H.; and Howley, Peter M., 5,491,064, Cl. 435-6.000.
Roberts, David D.; Krutzsch, Henry C.; Sipes, John M.; Guo, Nenghua; and Negre, Eric, 5,491,130, Cl. 514-13.000.
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Adler, Thomas A., 5,490,416, Cl. 73-82.000.
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Blake, David F.; Bryson, Charles; and Freund, Friedemann, 5,491,738, Cl. 378-71.000.
Finley, Mike; Scharf, Mike; Packard, Jeff; Kipp, Jim; Dudar, Tom; Owens, Jim; and Bindokas, Al, 5,490,848, Cl. 604-403.000.
Myers, W. Neill; Shadoan, Michael D.; Forbes, John C.; Baker, Kevin J.; and Rice, Darron C., 5,490,831, Cl. 602-26.000.
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Bond, James W., 5,491,716, Cl. 375-200.000.
Bucholtz, Frank; and McVicker, James A., 5,491,335, Cl. 250-227.250.
Gerlach, Karl R., 5,491,487, Cl. 342-378.000.
Grothaus, Michael G.; Korzekwa, Richard A.; and Hutcherson, R. Kenneth, 5,490,973, Cl. 422-186.040.
Hegedus, Charles R.; Hirst, Donald J.; and Eng, Anthony T., 5,491,185, Cl. 523-451.000.
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Whitman, Gary R.; and Rose, David A., 5,490,517, Cl. 128-774.000.
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Scheuermann, Kurt; and Ebert, Harald, 5,491,699, Cl. 371-22.100.
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Nicholas, David A.; Russell, Brian G.; Zvenyatsky, Boris; Matula, Paul A.; and Remiszewski, Stanley H., 5,490,819, Cl. 600-201.000.
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Justus, George L.; and Karasik, Vladimir, 5,490,664, Cl. 269-66.000.
Muscat, Orlando F.; Muller, Robert D.; and Feldman, Mark, 5,491,311, Cl. 200-4.000.
Newman, LaVerne R.; and Bogovican, Dragan, 5,491,312, Cl. 200-61.540.
Plyler, Robert G.; Rice, Terry A.; and Yi, Chong H., 5,490,802, Cl. 439-752.000.
Settles, Steven R.; and Tawil, Fady, 5,491,404, Cl. 323-283.000.
Stojkovic, Dragan B.; and Justus, George L., 5,490,663, Cl. 269-32.000.
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Marshall, Richard L., 5,490,380, Cl. 60-39.060.
Wormell, Dean C.; Huettig, Fred R.; Jankevics, Andrew J.; Winter, Michael; and Sopchak, James L., 5,491,642, Cl. 364-509.000.
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Brummond, William A.; and Upadhye, Ravindra S., 5,491,280, Cl. 588-202.000.
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Carlson, Joseph W.; and Kaufman, Leon, 5,490,509, Cl. 128-653.200.
Dirmi, Goberdhan P.; Campisi, Judith; and Peacocke, Monica, 5,491,069, Cl. 435-18.000.
Nguyen, Clark T.-C.; and Howe, Roger T., 5,491,604, Cl. 361-278.000.
Warner, Bruce E.; and McLean, William, II, 5,490,912, Cl. 204-298.020.
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Walder, Joseph A.; Walder, Roxanne Y.; Eder, Paul S.; and Dagle, John M., 5,491,133, Cl. 514-44.000.
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Stein, Daniel C.; Piekarowicz, Andrejez S.; and Yuan, Robert T., 5,491,060, Cl. 435-6.000.
Wellstood, Frederick C.; Mathai, Anna; Song, Dian; and Black, Randall C., 5,491,411, Cl. 324-248.000.
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Rieke, Reuben D., 5,490,951, Cl. 252-182.330.
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Vales, Enoch S., 5,490,743, Cl. 405-266.000.
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Person, Wayne C.; Theroux, Marc J.; Azarbarzin, Kurt; and Granger, Richard N., 5,490,856, Cl. 606-139.000.
UOP: *See*—
Frey, Stanley J.; Liu, David W.; Luebke, Charles P.; and Marker, Terry L., 5,491,267, Cl. 568-647.000.
Marinangeli, Richard E.; and Holmgren, Jennifer S., 5,491,271, Cl. 585-468.000.
Stine, Laurence O.; Hammershaimb, Harold U.; and Kocal, Joseph A., 5,491,277, Cl. 585-719.000.
Vora, Bipin V.; and Imai, Tamotsu, 5,491,275, Cl. 585-659.000.
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Upadhye, Ravindra S.: *See*—
Brummond, William A.; and Upadhye, Ravindra S., 5,491,280, Cl. 588-202.000.
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Lin, Chiu-Hong, 5,491,236, Cl. 546-101.000.
Shen, Robert W.; and Price, Jeffrey E., 5,490,987, Cl. 424-464.000.
Urakami, Tsuneyuki; and Tsuchiya, Yutaka, to Hamamatsu Photonics K.K. Photodetecting apparatus having intensity tuneable light irradiating unit. 5,491,329, Cl. 250-205.000.
Urata, Hisao: *See*—
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Uschold, Robert C.: *See*—
Hildwein, Roger L.; Uschold, Robert C.; Staley, J. D., Jr.; Riestenberg, Paul; Gallagher, Laura; and Nagao, Rex, 5,490,843, Cl. 604-164.000.
Uyeda, Alan K., to Adams Rite Manufacturing Company. Electric strike for fail safe or fail secure operation. 5,490,699, Cl. 292-341.160.
Uzgiris, Egidijus E.; Opsahl, Lorinda R.; Vosburgh, Kirby G.; Anthony, Thomas R.; and Cline, Harvey E., to General Electric Company. Targeted thermal release of drug-polymer conjugates. 5,490,840, Cl. 604-22.000.
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Pradhan, Dhiraj K.; and Vaidya, Nitin H., 5,491,705, Cl. 371-43.000.
Vakil, Usman, to Lights of America, Inc. Light fixture. 5,491,618, Cl. 362-147.000.
Vala, John D.: *See*—
Concannon, David J.; Copenhaver, Gary B.; Bakker, Johan P.; Catchpole, Clive E.; and Vala, John D., 5,491,336, Cl. 250-228.000.
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Junot, Gilbert; and Warnke, Pierre, 5,490,586, Cl. 192-89.230.
Vales, Enoch S., to University of Waterloo. System for installing material in the ground. 5,490,743, Cl. 405-266.000.
Valli, Ronald E.: *See*—
Heath, Chester A.; Langgood, John K.; and Valli, Ronald E., 5,491,804, Cl. 395-275.000.
Valmet Paper Machinery, Inc.: *See*—
Huovila, Jyrki; Nyberg, Petri; and Odell, Michael, 5,490,905, Cl. 162-212.000.
Van Alstine, Guy A. Cutting head stabilizer for tire groover. 5,490,330, Cl. 30-140.000.
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Rudibaugh, John W.; and Van Auken, Charles L., 5,490,464, Cl. 105-422.000.
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Hewko, Barry J., 5,490,703, Cl. 296-19.000.
Van de Geijn, Peter T.; Bealer, Kenneth H.; Earnest, Edward M.; Kuykendall, Kenneth H., Sr.; and Maccherone, Larry S., to Sweetheart Cup Company, Inc. Tamper evident container and related apparatus. 5,490,827, Cl. 493-109.000.
van der Burgt, Maarten J., to Shell Oil Company. Gas turbine system. 5,490,376, Cl. 60-39.060.
van der Hoeven, Frans A.; and Joyeux, Christophe, to Lever Brothers Company, Division of Conopco, Inc. Detergent composition or component containing anionic surfactant and process for its preparation. 5,490,954, Cl. 252-550.000.
Vanderpool, Frank. Score-keeping-with-carry score boards. 5,491,324, Cl. 235-90.000.
Van Der Sleen, Roelof: *See*—
Ratcliffe, Ralph D.; and Van Der Sleen, Roelof, 5,490,579, Cl. 187-266.000.
van Der Tol, Johannes J. G. M.: *See*—
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Van Der Waal, Robbert G.: *See*—
Veldhuis, Raymond N. J.; and Van Der Waal, Robbert G., 5,491,773, Cl. 395-2.380.
van Deventer, Mattijs O.; and van Der Tol, Johannes J. G. M., to Koninklijke PTT Nederland N.V. Optical hybrid with 3×3 coupling device. 5,491,763, Cl. 385-24.000.
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Van Hout, James E.; Madaj, David J.; Holloman, Roland; and Kuyava, Philip A., to Chrysler Corporation. Method and device for testing for audio induced sympathetic buzzes. 5,491,753, Cl. 381-58.000.
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Van Meter, James P.; Bagchi, Pranab; Thomas, Brian; and Rosiek, Thomas A., to Eastman Kodak Company. Yellow layer for color photographic elements. 5,491,052, Cl. 430-545.000.
van Reis, Robert D., to Genentech, Inc. Tangential flow filtration process and apparatus. 5,490,937, Cl. 210-637.000.
Van Rens, Russell J., to Outboard Marine Corporation. Double solenoid valve actuator. 5,490,534, Cl. 137-1.000.
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Hablanian, Marsbed, 5,490,761, Cl. 415-90.000.
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Santiesteban, Jose G.; Chang, Clarence D.; Vartuli, James C.; and Olson, David H., 5,491,273, Cl. 585-639.000.

Vaw Aluminium AG: *See—*
Moritz, C. J., 5,490,554, Cl. 164-437.000.

Vehviläinen, Pekka: *See—*
Rämö, Seija; Nevalainen, Kyösti; and Vehviläinen, Pekka, 5,490,405, Cl. 70-366.000.

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Velasquez, Galilea F.; and Steier, James R. Fastener assembly. 5,490,309, Cl. 24-90.100.

Veldhuis, Raymond N. J.; and Van Der Waal, Robbert G., to U.S. Philips Corporation. Encoding system comprising a subband coder for subband coding of a wideband digital signal constituted by first and second signal components. 5,491,773, Cl. 395-2.380.

Veligdan, James T., to Associated Universities, Inc. Vehicle security apparatus and method. 5,491,470, Cl. 340-825.310.

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McCune, Earl W., Jr.; and Venugopal, Narendar, 5,491,458, Cl. 332-144.000.

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Verduijn, Johannes P., to Exxon Chemical Patents Inc. Zeolite L. 5,491,119, Cl. 502-74.000.

Vergnat, Christian: *See—*
Bouraly, Jean-Pierre; Aebi, Jurg; Beaufils, Philippe; de Lestang, Michel; Gaffuri, Jean-Gilles; Hourlier, Hervé; Lallement, Jean-Jacques; Legroux, Philippe; Levai, Jean-Paul; Pondaven, Gérald; Schuster, Pierre; and Vergnat, Christian, 5,490,855, Cl. 606-88.000.

Verhille, Henri A. J.; Henrion, Michel A. R.; De Somer, Michel P. M.; and Pauwels, Bart J. G., to Alcatel N.V. Cell resequencing system for a telecommunication network. 5,491,728, Cl. 375-362.000.

Verhoeyen, Martine E.: *See—*
Beggs, Thomas S.; Davis, Paul J.; and Verhoeyen, Martine E., 5,490,988, Cl. 424-464.000.

Veronesi, Luciano; and Drake, James A., to Westinghouse Electric Corporation. Water jet propulsor powered by an integral canned electric motor. 5,490,768, Cl. 417-356.000.

Verrett, Sheldon P.: *See—*
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Smid, Jacob K.; and Verschuur, Jacobus G., 5,490,950, Cl. 252-174.210.

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Benjamin, Thomas L.; Chen-Wu, Joan; Hansen, Thomsen; Jackson, Barbara; Livingston, David; Tannenbaum, Steven; and Wogan, Gerald, 5,491,068, Cl. 435-7.320.

Vickerman, Linda J.: *See—*
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Victor Company of Japan, Ltd.: *See—*
Kaneda, Isami, 5,491,562, Cl. 358-342.000.
Nozawa, Takahiro; Nishizawa, Yukio; and Tanifuji, Naoki, 5,491,520, Cl. 348-625.000.

Vignoli, Giuliano. Pneumatically operated tire removal machine. 5,490,552, Cl. 157-1.240.

Vijay, Dilip P.: *See—*
Desu, Seshu B.; Yoo, In K.; Kwok, Chi K.; and Vijay, Dilip P., 5,491,102, Cl. 437-52.000.

Villagran, Francisco V.; McCabe, Gregory M.; and Wong, Vincent Y.-L., to Procter & Gamble Company, The. Process for making reduced fat nut spreads. 5,490,999, Cl. 426-633.000.

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Custro, Sergio; and Viola, Gian I., 5,491,197, Cl. 525-332.800.

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VLSI Technology, Inc.: *See—*
Hamzehdoost, Ahmad; and Mora, Leonard L., 5,491,362, Cl. 257-712.000.
Sharma, Balmukund K.; and Mahmood, Mossaddeq, 5,491,640, Cl. 364-488.000.
Small, Gary L., 5,491,426, Cl. 324-754.000.

Voelzke, Harry E., to Dakota Mfg. Co.,Inc. Hydraulic upper deck ramp for a trailer. 5,490,754, Cl. 414-537.000.

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Korpela, Thomas J., 5,490,555, Cl. 164-454.000.

Vogt, Lothar; and Herrmann, Matthias, to Blaupunkt-Werke GmbH. Circuit for digital processing of audio signals. 5,491,755, Cl. 381-86.000.

Voigt, Jürgen: *See—*
Behrens, Friedrich-Otto; Proössler, Ulrich; and Voigt, Jürgen, 5,490,725, Cl. 366-76.900.

Volante, Ralph P.: *See—*
Askin, David; Volante, Ralph P.; and Eng, Kan K., 5,491,238, Cl. 546-270.000.

Volk, John F.; and Michaels, Thomas, to Tri/West Systems, Inc. Syringe plunger rod mount. 5,490,842, Cl. 604-110.000.

Volkswagen AG: *See—*
Sinnhuber, Ruprecht; and Richter, Bernd, 5,490,691, Cl. 280-735.000.

Volna, William M.: *See—*
Rouse, Gordon F.; and Volna, William M., 5,491,475, Cl. 340-933.000.

Vom Dahl, Uwe; Lange, Peter; and Ziebach, Helmut, to Fluehs Drehtechnik GmbH. Unit for a single-lever mixing valve. 5,490,540, Cl. 137-625.170.

Vongnechten, Mark: *See—*
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Vora, Bipin V.; and Imai, Tamotsu, to UOP. Process for the dehydrogenation of paraffinic hydrocarbons. 5,491,275, Cl. 585-659.000.

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Uzgiris, Egidijus E.; Opsahl, Lorinda R.; Vosburgh, Kirby G.; Anthony, Thomas R.; and Cline, Harvey E., 5,490,840, Cl. 604-22.000.

Voss, Kenneth E.; Yavuz, Bulent O.; Farrauto, Robert J.; and Galligan, Michael P., to Engelhard Corporation. Oxidation catalyst with bulk ceria, a second bulk metal oxide, and platinum. 5,491,120, Cl. 502-304.000.

Votruba, Jan: *See—*
Damadian, Raymond V.; and Votruba, Jan, 5,490,513, Cl. 128-653.200.

Vrba, Anthony C.: *See—*
Mische, Hans A.; Ressemann, Thomas V.; Vrba, Anthony C.; and Hackett, Steven S., 5,490,859, Cl. 606-159.000.

Vrona, David W.; Lavender, Michael R.; Peterson, James J.; and Love, Margo E., to Hollister Inc. Endotracheal tube attachment device. 5,490,504, Cl. 128-207.170.

Vuch, Walter; and Mattera, Mario. Surveying system using radio ranging and barometric height. 5,491,485, Cl. 342-191.000.

Vuillamy, Didier: *See—*
Bonniot, Claude; Vuillamy, Didier; Desclos, Pierre; Tiret, Etienne; and Beaurain, André, 5,490,629, Cl. 239-265.150.

W. R. Grace & Co.-Conn.: *See—*
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Hammeken, Michael, 5,490,926, Cl. 210-321.740.
Kuo, Betsy P., 5,491,019, Cl. 428-213.000.

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Graves, Howard, 5,490,303, Cl. 15-230.110.
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Wu, Otto. Massage device for the soles of the feet. 5,490,821, Cl. 601-134.000.
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Mok, Lawrence S.-W.; Purushothaman, Sampath; Sammakia, Bahgat G.; Wilczynski, Janusz S.; and Wu, Tien Y., 5,491,610, Cl. 361-695.000.
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Yamada, Kenichi, to Takigen Manufacturing Co. Ltd. Door locking handle assembly. 5,490,404, Cl. 70-210.000.
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Ikeda, Keijiroh, 5,490,474, Cl. 114-343.000.
Yamaho Giken Kabushiki Kaisha: *See*—
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Nakamura, Ryuichi; and Nakano, Kazunori, 5,490,796, Cl. 439-266.000.
Yamamoto, Hiroshi, to Fujitsu Limited. Power feed path switching circuit. 5,491,368, Cl. 307-113.000.
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Yamamoto, Masayuki, to Yazaki Corporation. Connector assembly with association indicator. 5,490,799, Cl. 439-489.000.
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Yamanaka, Tetsuji: *See*—
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Shaltiel, Shmuel, 5,491,129, Cl. 514-12.000.
Yee, Albert G.; and Akeel, Hadi A., to Fanuc USA Corporation. Six axis force sensor employing multiple shear strain gages. 5,490,427, Cl. 73-767.000.
Yee, Dawson L.; and Solari, Edward L., to Intel Corporation. Apparatus using a state machine for generating selectable clock frequencies and a fixed frequency for operating a computer bus. 5,491,814, Cl. 395-550.000.
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Yonekura, Yuri: *See*—
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Yoshino, Norio, to Daikin Industries, Ltd. Fluorine-containing aromatic compounds. 5,491,257, Cl. 562-41.000.

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Kim, Yeong-U; Zaremski, Donald R.; and Hertzler, Carol S., 5,490,908, Cl. 148-241.000.

Zecchi, Elisa: *See*—
Tanaglia, Tiziano; Banzi, Viviano; and Zecchi, Elisa, 5,491,208, Cl. 526-143.000.

Zeck, Mark V., to Y-Z Industries Sales, Inc. Precision small displacement fluid pump. 5,490,766, Cl. 417-63.000.

Zeiser, Philip R.: *See*—
Aversa, Piero; Ives, David C.; Minger, Hajnal; Ojala, William K.; and Zeiser, Philip R., 5,490,488, Cl. 123-570.000.

Zeisz, Raymond L., Jr.: *See*—
Christensen, Kenneth J.; Siegel, Michael S.; Strole, Norman C.; and Zeisz, Raymond L., Jr., 5,491,687, Cl. 370-17.000.

Zemke, Joy D., legal representative: *See*—
Pihl, Richard M.; Hayes, Duane J.; Barber, Loren L., Jr.; Welygan, Dennis G.; Hardwick, R. Eugene; Zemke, Ronald O., deceased, 5,491,025, Cl. 428-373.000.

Zemke, Ronald O., deceased (by Joy D. Zemke, legal representative): *See*—
Pihl, Richard M.; Hayes, Duane J.; Barber, Loren L., Jr.; Welygan, Dennis G.; Hardwick, R. Eugene; Zemke, Ronald O., deceased, 5,491,025, Cl. 428-373.000.

Zeneca Limited: *See*—
Streeting, Ian T., deceased; and Worthington, Paul A., 5,491,156, Cl. 514-367.000.

Zenith Electronics Corporation: *See*—
Auld, Frederick H., Jr.; and Long, Michael E., 5,491,748, Cl. 380-15.000.

Zerbinati, Gianfranco, to Dolomite S.p.A. Article of sport footwear, in particular a ski boot. 5,490,337, Cl. 36-119.000.

Zevin, William M.: *See*—
Davis, Gordon T.; Linger, Judith M.; Mandalia, Baiju D.; Sinibaldi, John C.; Zevin, William M.; and Ziegenhain, Karl-Heinz, 5,491,720, Cl. 375-222.000.

Zhang, Wei; and Doi, Kunio, to Arch Development Corporation. Method and system for the detection of microcalcifications in digital mammograms. 5,491,627, Cl. 364-413.200.

Zhao, Chen: *See*—
Stuk, Timothy L.; Allen, Michael S.; Haight, Anthony R.; Kerdesky, Francis A.; Langridge, Denton C.; Leanna, M. Robert; Lijewski, Linda M.; Melcher, Laura; Morton, Howard E.; Norbeck, Daniel W.; Reno, Daniel S.; Robbins, Timothy A.; Scarpetti, David; Sham, Hing L.; Sowin, Thomas J.; Tien, Jien-Heh J.; and Zhao, Chen, 5,491,253, Cl. 560-27.000.

Ziebach, Helmut: *See*—
Vom Dahl, Uwe; Lange, Peter; and Ziebach, Helmut, 5,490,540, Cl. 137-625.170.

Ziegenhain, Karl-Heinz: *See*—
Davis, Gordon T.; Linger, Judith M.; Mandalia, Baiju D.; Sinibaldi, John C.; Zevin, William M.; and Ziegenhain, Karl-Heinz, 5,491,720, Cl. 375-222.000.

Zoccoli, Michael A.: *See*—
Picone, Teresa K. H.; McCallum, Theresa M.; and Zoccoli, Michael A., 5,491,225, Cl. 536-24.320.

Zook, Christopher P., to Cirrus Logic, Inc. Burst error corrector. 5,491,701, Cl. 371-39.100.

Zuckerman, Martin, to Emhart Inc. Sheet metal U.L. screw. 5,490,700, Cl. 292-357.000.

Zuniga, Michael A.: *See*—
Bartlett, Charles S.; Benning, Roger D.; Hunter, John B.; Sanford, Charles; and Zuniga, Michael A., 5,491,747, Cl. 379-433.000.

Zupo, Alan L.; and Brown, Roger G., to Socket Butler Inc. Tool for removing broken light bulbs. 5,490,438, Cl. 81-53.110.

Zvenyatsky, Boris: *See*—
Nicholas, David A.; Russell, Brian G.; Zvenyatsky, Boris; Matula, Paul A.; and Remiszewski, Stanley H., 5,490,819, Cl. 600-201.000.

607541 Saskatchewan Inc.: *See*—
Biette, Douglas A., 5,490,549, Cl. 150-167.000.

3Com Corporation: *See*—
Co, Ramon S.; and Kao, Ron, 5,491,729, Cl. 375-376.000.

# LIST OF REISSUE PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 13th DAY OF FEBRUARY, 1996

NOTE— Arranged in accordance with the first significant character or word if the name (in accordance with city and telephone directory practice).

Arata, Tadao: *See*—
Tanaka, Shinsaku; Arata, Tadao; and Kitazawa, Takayuki, Re. 35,155, Cl. 360-96.500.

Hardee, Kim C., to Thorn EMI North America, Inc. Bit line and column circuitry used in a semiconductor memory. Re. 35,154, Cl. 365-189.090.

Kitazawa, Takayuki: *See*—
Tanaka, Shinsaku; Arata, Tadao; and Kitazawa, Takayuki, Re. 35,155, Cl. 360-96.500.

Tanaka, Shinsaku; Arata, Tadao; and Kitazawa, Takayuki, to Tanashin Denki Co., Ltd. Cassette holding device for a tape recorder. Re. 35,155, Cl. 360-96.500.

Tanashin Denki Co., Ltd.: *See*—
Tanaka, Shinsaku; Arata, Tadao; and Kitazawa, Takayuki, Re. 35,155, Cl. 360-96.500.

Thorn EMI North America, Inc.: *See*—
Hardee, Kim C., Re. 35,154, Cl. 365-189.090.

# LIST OF REEXAMINATION PATENTEES

TO WHOM

CERTIFICATES WERE ISSUED

Johnson Matthey Inc.: *See*—
Nguyen, My N., B1 5,195,299, Cl. 53-428.000.

Jordan, Mark: *See*—
Mammano, Robert A.; and Jordan, Mark, B1 5,272,396, Cl. 326-30.000.
Mammano, Robert A.; and Jordan, Mark, B1 5,338,979, Cl. 326-30.000.

Mammano, Robert A.; and Jordan, Mark, to Unitrode Corporation. Controllable bus terminator with voltage regulation. B1 5,272,396, Cl. 326-30.000.

Mammano, Robert A.; and Jordan, Mark, to Unitrode Corporation. Controllable bus terminator. B1 5,338,979, Cl. 326-30.000.

Nguyen, My N., to Johnson Matthey Inc. Method of reducing moisture content of hermetic packages containing semiconductor devices. B1 5,195,299, Cl. 53-428.000.

Oellerking, Willi, to Schleswiger Tauwerkfabric Oellerking GmbH & Co. KG. Repair patch for container and lorry sheets. B1 4,286,007, Cl. 498-194.000.

Schleswiger Tauwerkfabric Oellerking GmbH & Co. KG: *See*—
Oellerking, Willi, B1 4,286,007, Cl. 498-194.000.

Unitrode Corporation: *See*—
Mammano, Robert A.; and Jordan, Mark, B1 5,272,396, Cl. 326-30.000.
Mammano, Robert A.; and Jordan, Mark, B1 5,338,979, Cl. 326-30.000.

# LIST OF DESIGN PATENTEES

Abed, Tareq: *See*—
Hood, Oliver; Doyle, John; Wilson, Jay; Abed, Tareq; and O'Connell, John, 367,047, Cl. D14-114.000.

Adams, Charles S.: *See*—
Fielding, Douglas R.; and Adams, Charles S., 366,993, Cl. D7-669.000.

Airlux Electrical Co., Ltd.: *See*—
Hsu, Maxwell, 366,984, Cl. D7-376.000.

Aizawa, Taizou: *See*—
Koizumi, Osamu; and Aizawa, Taizou, 367,050, Cl. D14-121.000.

Alfaro, Conrad; and Happ, Lawrence, to Cooper Industries, Inc. Fused disconnect switch. 367,041, Cl. D13-160.000.

Allegre, Jean-Paul, to Allegre Puericulture Hygiene S.A. Spill-proof cup. 366,987, Cl. D7-510.000.

Allegre Puericulture Hygiene S.A.: *See*—
Allegre, Jean-Paul, 366,987, Cl. D7-510.000.

Allen, Charles S.; and Gronwick, Jerry P., to Sloan Valve Company. Flush valve. 367,104, Cl. D23-245.000.

Allibert: *See*—
Sauvage, Thomas, 366,969, Cl. D6-368.000.

Alps Electric (Ireland), Ltd.: *See*—
Hood, Oliver; Doyle, John; Wilson, Jay; Abed, Tareq; and O'Connell, John, 367,047, Cl. D14-114.000.

Amiel, Richard, to Arthur Eugster AG. Pump-type espresso machine. 366,982, Cl. D7-309.000.

AMSC Subsidiary Corporation: *See*—
Ross, David J.; Isaacs, Blake L.; and Skaggs, Paul T., 367,043, Cl. D14-100.000.

Anderson & Associates Enterprises, Inc.: *See*—
Anderson, Jeffery A., 367,080, Cl. D21-27.000.

Anderson, Jeffery A., to Anderson & Associates Enterprises, Inc. Game board. 367,080, Cl. D21-27.000.

Anzai, Masahiro: *See*—
Maeda, Joji; and Anzai, Masahiro, 367,070, Cl. D15-1.000.

Arakaki, James S., to Verifone Inc. Transaction terminal console. 367,044, Cl. D14-105.000.

Arthur Eugster AG: *See*—
Amiel, Richard, 366,982, Cl. D7-309.000.

Aspects, Inc.: *See*—
Bescherer, Robert E., 367,134, Cl. D30-127.000.

Augaitis, Sheila R.; and Logan, Robert J., to Thomson Consumer Electronics, Inc. Video remote control. 367,060, Cl. D14-218.000.

Axelgaard, Jens. Medical electrode. 367,108, Cl. D24-168.000.

B & B Crafts Inc.: *See*—
Elsbury, Robert F., 366,968, Cl. D6-351.000.

Baby Björn AB: *See*—
Jakobson, Björn; and Bergkvist, Håkan, 367,106, Cl. D23-296.000.

Baby's Dream Furniture, Inc.: *See*—
Pollard, Patrick L., 366,970, Cl. D6-383.000.

Backstrom, Mikael R.: *See*—
Herbst, Walter B.; Hartman, John D.; and Backstrom, Mikael R., 367,004, Cl. D9-300.000.

Baily, Gregory E.: *See*—
Barber, David G.; Hampson, David M.; Iles, John A. D.; and Baily, Gregory E., 367,115, Cl. D24-169.000.

Ballanda Limited: *See*—
Wong, L. Ling, 367,057, Cl. D14-171.000.

Barber, David G.; Hampson, David M.; Iles, John A. D.; and Baily, Gregory E., to Huntleigh Technology PLC. Combined pump and inflation controller for limb compression or pneumatic mattresses and supports. 367,115, Cl. D24-169.000.

Barnes Group: *See*—
Grey, John J., 367,002, Cl. D8-397.000.
Grey, John J., 367,003, Cl. D8-397.000.

Barre, Bertrand, to Chesebrough-Pond's USA Co., Division of Conopco, Inc. Toothbrush handle with stand. 366,961, Cl. D4-108.000.

Batey, Bobby M. Ostomy cutter. 367,117, Cl. D24-147.000.

Benson, Steven R. Clutch cover plate. 367,023, Cl. D12-126.000.

Bergkvist, Håkan: *See*—
Jakobson, Björn; and Bergkvist, Håkan, 367,106, Cl. D23-296.000.

Berman, John A., to Dynacraft Industries Inc. Bicycle bag. 367,034, Cl. D12-409.000.

Bernat, Jomar P., to Polaris Industries Partners L.P. Snowmobile runner. 367,018, Cl. D12-7.000.

Berti, Enzo, to Libman Company, The. Brush handle. 366,963, Cl. D4-138.000.

Berti, Enzo, to Libman Company, The. Brush handle. 366,964, Cl. D4-138.000.

Bescherer, Robert E., to Aspects, Inc. Bird feeder. 367,134, Cl. D30-127.000.

Billingsley, John. Vehicle sleep timer. 367,012, Cl. D10-40.000.

Black & Decker Inc.: *See*—
Carbone, Richard; and Correa, Alvaro, 366,997, Cl. D8-36.000.

Blanton, Dan R.: *See*—

Vaughn, Lori; Boes, Barry S.; Fradella, Steven F.; King, Jeffrey S.; Castilla, Jorge N.; Romero, Osvaldo D.; Blanton, Dan R.; Coonley, Gregary; and Lopatukhin, Eugene, 367,059, Cl. D14-191.000.

Blye, Bruce A., to National Electric Mfg. Corp. Top and sides of a drop light. 367,123, Cl. D26-42.000.

Boes, Barry S.: *See—*
Vaughn, Lori; Boes, Barry S.; Fradella, Steven F.; King, Jeffrey S.; Castilla, Jorge N.; Romero, Osvaldo D.; Blanton, Dan R.; Coonley, Gregary; and Lopatukhin, Eugene, 367,059, Cl. D14-191.000.

Boix Gacia, Maria, to Inoxcrom, S.A. Ballpoint pen. 367,076, Cl. D19-51.000.

Bonaddio, Vincenzo A.; and De Jesus Munoz Contreras, Jose, to Foamex L.P. Combined juvenile seat with footrest. 366,966, Cl. D6-335.000.

Bouldoukian, Vahe, to Mercedes-Benz AG. Wheel. 367,030, Cl. D12-209.000.

Brashear, Daniel F.: *See—*
Camfield, David K.; and Brashear, Daniel F., 367,021, Cl. D12-114.000.

Braunberg, Gregory C.: *See—*
Morrow, Ernest J.; and Braunberg, Gregory C., 367,042, Cl. D13-184.000.

Braunschweig, James R.: *See—*
Jackovin, Gary B.; and Braunschweig, James R., 367,135, Cl. D32-5.000.

Bright, Joseph P., to Industrial Dimensions, Inc. Shelf bracket. 367,001, Cl. D8-381.000.

Brooks, David H., Jr., to Pitney Bowes, Inc. Postage computing scale with meter interface. 367,015, Cl. D10-91.000.

Broussard, Robert. Crucifix. 367,147, Cl. D99-27.000.

Brown, David E. Support frame for bags with handles. 367,139, Cl. D34-5.000.

Brunswick Bowling & Billiards Corporation: *See—*
Stirling, Michael F.; Katje, Michael J.; and Visser, Piet, 367,097, Cl. D21-233.000.

Bulgari, Paolo, to Partecipazioni Bulgari S.p.A. Cutlery, comprising fork, knife and spoon. 366,991, Cl. D7-645.000.

Bustos, Rafael T., to L&P Property Management Company. Six-sided refrigerated merchandiser. 366,976, Cl. D6-470.000.

Byers, Gary L.; and Byers, Timothy W. Plumb bob string holder. 366,994, Cl. D8-14.000.

Byers, Timothy W.: *See—*
Byers, Gary L.; and Byers, Timothy W., 366,994, Cl. D8-14.000.

Cahow, Chris A. Buzzing fishing lure. 367,100, Cl. D22-126.000.

California Pellet Mill Company: *See—*
Thom, Kelsey C., Jr.; and Olson, William S., 367,069, Cl. D15-143.000.

Camfield, David K.; and Brashear, Daniel F., to Roadmaster Corporation. Simulated motorcycle engine for a bicycle. 367,021, Cl. D12-114.000.

Canon Kabushiki Kaisha: *See—*
Matsuda, Yoshiyuki, 367,045, Cl. D14-106.000.

Carbone, Richard; and Correa, Alvaro, to Black & Decker Inc. Can opener. 366,997, Cl. D8-36.000.

Cardozo, Robert T.: *See—*
Miller, Forrest A.; and Cardozo, Robert T., 367,118, Cl. D24-188.000.

Cardpro, Inc.: *See—*
Clinard, Ralph H., 367,148, Cl. D99-28.000.

Castilla, Jorge N.: *See—*
Vaughn, Lori; Boes, Barry S.; Fradella, Steven F.; King, Jeffrey S.; Castilla, Jorge N.; Romero, Osvaldo D.; Blanton, Dan R.; Coonley, Gregary; and Lopatukhin, Eugene, 367,059, Cl. D14-191.000.

Cattaneo, Pierre, to Liaisons Electroniques-Mecaniques Lem S.A. Electrical current sensor. 367,013, Cl. D10-75.000.

Champ, Jeffrey T.: *See—*
Meeker, Paul K.; Gibson, William R.; and Champ, Jeffrey T., 366,967, Cl. D6-339.000.

Chang, Charlene Y.: *See—*
Lilly, April Y.; and Chang, Charlene Y., 367,011, Cl. D9-550.000.

Chapman, Brian L.; and Chapman, Craig J. V. Rotatable sign. 367,077, Cl. D20-21.000.

Chapman, Craig J. V.: *See—*
Chapman, Brian L.; and Chapman, Craig J. V., 367,077, Cl. D20-21.000.

Charcoal Companion, Inc.: *See—*
Fielding, Douglas R.; and Adams, Charles S., 366,993, Cl. D7-669.000.

Chen, Ruey-Zon. Lathe. 367,066, Cl. D15-130.000.

Chesebrough-Pond's USA Co., Division of Conopco, Inc.: *See—*
Barre, Bertrand, 366,961, Cl. D4-108.000.

Chesler, Fleur: *See—*
Chesler, Mark C.; and Chesler, Fleur, 367,086, Cl. D21-108.000.

Chesler, Mark C.; and Chesler, Fleur. H-connector for toy construction system. 367,086, Cl. D21-108.000.

Cheung, Gary. Cutlery stand. 366,990, Cl. D7-637.000.

Chrysler Corporation: *See—*
Hubbach, Robert N., 367,031, Cl. D12-209.000.

Ciba Corning Diagnostics Corp.: *See—*
D'Orazio, Paul A.; and Flaherty, James E., 367,014, Cl. D10-81.000.

Clinard, Ralph H., to Cardpro, Inc. Scrip machine. 367,148, Cl. D99-28.000.

Clorox Company, The: *See—*
Lilly, April Y.; and Chang, Charlene Y., 367,011, Cl. D9-550.000.

Coddington, Russell J., Jr.; and Nolan, Robert J., to Hedstrom Corporation. Dual swing seating platform. 367,099, Cl. D21-246.000.

Conair Corporation: *See—*
Rizzuto, Leandro P., 367,128, Cl. D28-13.000.

Coonley, Gregary: *See—*
Vaughn, Lori; Boes, Barry S.; Fradella, Steven F.; King, Jeffrey S.; Castilla, Jorge N.; Romero, Osvaldo D.; Blanton, Dan R.; Coonley, Gregary; and Lopatukhin, Eugene, 367,059, Cl. D14-191.000.

Cooper Industries, Inc.: *See—*
Alfaro, Conrad; and Happ, Lawrence, 367,041, Cl. D13-160.000.

Correa, Alvaro: *See—*
Carbone, Richard; and Correa, Alvaro, 366,997, Cl. D8-36.000.

Cotter, Robert F. Blood collector. 367,110, Cl. D24-118.000.

Crimi, Salvatore V. Toothbrush. 366,960, Cl. D4-104.000.

Dacor: *See—*
Leukhardt, Alan; Layfield, James, Jr.; and Smith, Ray G., 366,983, Cl. D7-349.000.

Davis, Steven D., to W. A. Lane, Inc. Pair of pouch forming tool jaws. 366,995, Cl. D15-146.000.

Davison, Micke, to Thomson Consumer Electronics (Société Anonyme). Remote control unit. 367,061, Cl. D14-218.000.

De Jesus Munoz Contreras, Jose: *See—*
Bonaddio, Vincenzo A.; and De Jesus Munoz Contreras, Jose, 366,966, Cl. D6-335.000.

Dempsey, Mark A. Combined transmitter and receiver for locating lost remote control unit. 367,017, Cl. D10-104.000.

de Paris, Alexandre K. Hair comb. 367,129, Cl. D28-28.000.

Dinand, Pierre, to Euroitalia S.r.l. Container for perfumes and cosmetic products. 367,009, Cl. D9-519.000.

Dolan, Patrick S. Chandelier. 367,125, Cl. D26-81.000.

Donly, Tom. Toy construction element. 367,035, Cl. D21-108.000.

D'Orazio, Paul A.; and Flaherty, James E., to Ciba Corning Diagnostics Corp. Solid state planar sensor. 367,014, Cl. D10-81.000.

Doyle, John: *See—*
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Drucker, John R., to Speer Lamp Corp. of New York, The. Table lamp. 367,126, Cl. D26-93.000.

Dynacraft Industries Inc.: *See—*
Berman, John A., 367,034, Cl. D12-409.000.

Dynamics Corporation of America Through Waring Products Division: *See—*
Ruck, Robin W., 366,992, Cl. D7-665.000.

Dynapro Systems Inc.: *See—*
Kaga, Gary, 366,975, Cl. D6-470.000.

EarCraft Technologies, Inc.: *See—*
Weeks, Eric L., 367,113, Cl. D24-174.000.

Elizabeth Arden Company, Division of Conopco, Inc.: *See—*
Paglina, Denise, 367,007, Cl. D9-439.000.

Elsbury, Robert F., to B & B Crafts Inc. Footstool. 366,968, Cl. D6-351.000.

Esselte Dyno N.V.: *See—*
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Euroitalia S.r.l.: *See—*
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Eurostar, Inc.: *See—*
Ho, Katey, 366,951, Cl. D2-907.000.

Fairweather, Jim R. Vehicle rear bumper. 367,028, Cl. D12-169.000.

Fan, Eric: *See—*
Kuo, Chien-Lung; and Fan, Eric, 367,073, Cl. D16-232.000.

Faulk, Robin B.; and Henderson, Jonathan B., to Michelin Recherche et Technique S.A. Tire. 367,025, Cl. D12-141.000.

Fentress, Delmar G.; and McManaway, Allen C., to Fentress Marine. Adjustable supporting surface. 367,032, Cl. D12-317.000.

Fentress Marine: *See—*
Fentress, Delmar G.; and McManaway, Allen C., 367,032, Cl. D12-317.000.

Ferdman, Morris. Curtain hanger. 366,999, Cl. D8-368.000.

Fielding, Douglas R.; and Adams, Charles S., to Charcoal Companion, Inc. Food basting tool. 366,993, Cl. D7-669.000.

Fillion-Robin, Isabo. Antenna. 367,063, Cl. D14-235.000.

Fladung, Philip; and Geis, Mark W., to Woods Industries, Inc. Electrical outlet unit. 367,037, Cl. D13-139.000.

Fladung, Philip; and Geis, Mark W., to Woods Industries, Inc. Electrical outlet unit. 367,038, Cl. D13-139.000.

Flaherty, James E.: *See—*
D'Orazio, Paul A.; and Flaherty, James E., 367,014, Cl. D10-81.000.

Foamex L.P.: *See—*
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Formosa Electronic Industries Inc.: *See—*
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Foster, Susan L. Tree stand. 367,122, Cl. D25-62.000.

Fradella, Steven F.: *See—*
Vaughn, Lori; Boes, Barry S.; Fradella, Steven F.; King, Jeffrey S.; Castilla, Jorge N.; Romero, Osvaldo D.; Blanton, Dan R.; Coonley, Gregary; and Lopatukhin, Eugene, 367,059, Cl. D14-191.000.

Friedrich Grohe Aktiengesellschaft: *See—*
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Gardner, Carolyn F. Television muting control. 367,064, Cl. D14-239.000.

Garrison, George L. Float. 367,098, Cl. D21-237.000.

Garrow, Russell M. Skill game. 367,079, Cl. D21-1.000.

Gay, Kenneth M., to Schering-Plough HealthCare Products, Inc. Work boot insole. 366,956, Cl. D2-961.000.

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Fladung, Philip; and Geis, Mark W., 367,037, Cl. D13-139.000.
Fladung, Philip; and Geis, Mark W., 367,038, Cl. D13-139.000.

Gholson, General J., Jr. Clarinet ligature. 367,074, Cl. D17-13.000.

Gibson, William R.: *See*—
Meeker, Paul K.; and Gibson, William R., 366,965, Cl. D6-333.000.
Meeker, Paul K.; Gibson, William R.; and Champ, Jeffrey T., 366,967, Cl. D6-339.000.

Gillette Company, The: *See*—
Herbst, Walter B.; Hartman, John D.; and Backstrom, Mikael R., 367,004, Cl. D9-300.000.

Goertz, Dale L. Portable sink for pet care. 367,105, Cl. D23-286.000.

Goto, Masaaki, to Matsushita Electric Industrial Co., Ltd. Video camera with video tape recorder. 367,072, Cl. D16-202.000.

Graber, Thomas L., to Madrax, Inc. Bicycle rack. 367,022, Cl. D12-115.000.

Green, Dennis E. Re-freezable cooling cartridge for drinking bottles. 367,068, Cl. D15-90.000.

Grey, John J., to Barnes Group. Railroad lock nut fastener. 367,002, Cl. D8-397.000.

Grey, John J., to Barnes Group. Railroad lock nut fastener. 367,003, Cl. D8-397.000.

Gronwick, Jerry P.: *See*—
Allen, Charles S.; and Gronwick, Jerry P., 367,104, Cl. D23-245.000.

Gulf Stream Coach, Inc.: *See*—
Shea, James F., Sr., 367,020, Cl. D12-100.000.

Gustine, Floyd L. Elastic golf tee. 367,092, Cl. D21-208.000.

Ha, Jang P. Stone surround for defining a grave site. 367,146, Cl. D99-20.000.

Hamada, Shinobu, to Sega Enterprises, Ltd. Multi way connector. 367,040, Cl. D13-147.000.

Hamilton, Bill E. Plastic pallet. 367,145, Cl. D34-38.000.

Hampson, David M.: *See*—
Barber, David G.; Hampson, David M.; Iles, John A. D.; and Baily, Gregory E., 367,115, Cl. D24-169.000.

Happ, Lawrence: *See*—
Alfaro, Conrad; and Happ, Lawrence, 367,041, Cl. D13-160.000.

Haraga, Shinya; and Sekino, Hajime, to Tottori Sanyo Electric Co., Ltd. Computer. 367,046, Cl. D14-106.000.

Harley, Peter J. Playing card holder. 367,082, Cl. D21-54.000.

Harr, Charles O. Adjustable article holder and carrier. 366,958, Cl. D3-259.000.

Hartman, John D.: *See*—
Herbst, Walter B.; Hartman, John D.; and Backstrom, Mikael R., 367,004, Cl. D9-300.000.

Hasegawa, Shigeru: *See*—
Ito, Masafumi; Hasegawa, Shigeru; Takashima, Katsuhiro; Tsunoda, Keiji; and Shimizu, Yasunobu, 367,052, Cl. D14-162.000.

Hedstrom Corporation: *See*—
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Heineken Technical: *See*—
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Thom, Kelsey C., Jr.; and Olson, William S., to California Pellet Mill Company. Pillow block bearing housing. 367,069, Cl. D15-143.000.
Thompson, Janet. CD holder. 366,972, Cl. D6-407.000.
Thomson Consumer Electronics (Société Anonyme): *See*—
Davison, Micke, 367,061, Cl. D14-218.000.
Thomson Consumer Electronics, Inc.: *See*—
Augaitis, Sheila R.; and Logan, Robert J., 367,060, Cl. D14-218.000.
Tinen, William J., to USG Interiors, Inc. Fiberglass reinforced gypsum ceiling panel. 367,120, Cl. D25-157.000.
Tire Shuttle, Inc.: *See*—
Suggs, David W.; and Suggs, Donald R., Sr., 367,141, Cl. D34-27.000.
Torres, Jose. Musical drum tuning key. 366,996, Cl. D8-29.000.
Tottori Sanyo Electric Co., Ltd.: *See*—
Haraga, Shinya; and Sekino, Hajime, 367,046, Cl. D14-106.000.
Travers, John F.: *See*—
Miller, D. Scott; and Travers, John F., 366,973, Cl. D6-445.000.
Tremlett, Jonathan, to Esselte Dyno N.V. Portable printer for adhesive backed labels. 367,075, Cl. D18-52.000.
Trunk, Gary A. Tetrahedron housing structure. 367,119, Cl. D25-23.000.
Tsunoda, Keiji: *See*—
Ito, Masafumi; Hasegawa, Shigeru; Takashima, Katsuhiro; Tsunoda, Keiji; and Shimizu, Yasunobu, 367,052, Cl. D14-162.000.
Tu, Ming-Tsang. Handle of pots and pans. 366,985, Cl. D7-395.000.
Tubbs, Michael A.: *See*—
Selby, Theodore W.; Miller, Gregory C.; Wolfe, Kevin J.; and Tubbs, Michael A., 367,016, Cl. D10-96.000.
U.S. Philips Corporation: *See*—
Leveridge, Philip, 367,081, Cl. D21-48.000.
USG Interiors, Inc.: *See*—
Tinen, William J., 367,120, Cl. D25-157.000.
Valle, Diego D. Shoe sole. 366,955, Cl. D2-954.000.
Vaughn, Lori; Boes, Barry S.; Fradella, Steven F.; King, Jeffrey S.; Castilla, Jorge N.; Romero, Osvaldo D.; Blanton, Dan R.; Coonley, Gregary; and Lopatukhin, Eugene, to Motorola, Inc. Front surface for a display for a radio pager. 367,059, Cl. D14-191.000.
Verifone Inc.: *See*—
Arakaki, James S., 367,044, Cl. D14-105.000.
Viazis, Anthony D. Orthodontic bracket. 367,116, Cl. D24-180.000.
Vining Industries, Inc.: *See*—
Hoagland, Mary M.; and Juratovac, Diana W., 367,136, Cl. D32-44.000.
Visser, Piet: *See*—
Stirling, Michael F.; Katje, Michael J.; and Visser, Piet, 367,097, Cl. D21-233.000.
W. A. Lane, Inc.: *See*—
Davis, Steven D., 366,995, Cl. D15-146.000.
Warrilow, Terence J. Dual compartment dispensing bottle. 367,005, Cl. D9-341.000.
Weeks, Eric L., to EarCraft Technologies, Inc. Air conduction hearing aid. 367,113, Cl. D24-174.000.
Weir, Robert E. Croquet mallet. 367,093, Cl. D21-210.000.
Welch Allyn, Inc.: *See*—
Peart, Edward L.; McGlone, Donald R.; Knieriem, Alan S.; and Laun, Deborah A., 367,111, Cl. D24-166.000.
Wells, Betty M. Articles support console for automobiles. 367,035, Cl. D12-419.000.
Welter's Co., Ltd.: *See*—
Hsu, Walter W., 367,130, Cl. D28-64.000.
Whit Corporation: *See*—
Whitaker, W. Michael, 366,962, Cl. D4-116.000.
Whitaker, W. Michael, to Whit Corporation. Combined scrubber and scraper. 366,962, Cl. D4-116.000.
Whitbread PLC: *See*—
Sillince, Mark E.; and Rosens, Erwin A., 367,008, Cl. D9-456.000.
Williams, David M., to McPherson's Limited. Cutlery handle. 366,986, Cl. D7-401.200.
Williams, Robert J., Jr. Metal wood club head. 367,094, Cl. D21-214.000.
Wilson, Brian; and Krogh, Ross, to Pasteur Sanofi Diagnostics. Specimen sample cup for use in an automatic analyzer. 367,114, Cl. D24-224.000.
Wilson, Jay: *See*—
Hood, Oliver; Doyle, John; Wilson, Jay; Abed, Tareq; and O'Connell, John, 367,047, Cl. D14-114.000.
Wolfe, Kevin J.: *See*—
Selby, Theodore W.; Miller, Gregory C.; Wolfe, Kevin J.; and Tubbs, Michael A., 367,016, Cl. D10-96.000.
Wong, L. Ling, to Ballanda Limited. Radio clock. 367,057, Cl. D14-171.000.
Woods Industries, Inc.: *See*—
Fladung, Philip; and Geis, Mark W., 367,037, Cl. D13-139.000.
Fladung, Philip; and Geis, Mark W., 367,038, Cl. D13-139.000.
Wu, Michael, to Formosa Electronic Industries Inc. Cellular telephone rack. 367,065, Cl. D14-253.000.
Zimmerman, Larry G., to Sterilite Corporation. Storage container. 366,989, Cl. D7-629.000.

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Drewlow, Lyndon W., to Mikkelsens Inc. Poinsettia plant named 'Red Delight'. 9,452, Cl. Plt.-86.400.

Mikkelsens Inc.: *See*—
Drewlow, Lyndon W., 9,452, Cl. Plt.-86.400.

# CLASSIFICATION OF PATENTS

## ISSUED FEBRUARY 13, 1996

NOTE—First number, class; second number, subclass; third number, patent number

**CLASS 2**

49.2 5,490,289
159 5,490,290

**CLASS 4**

661 5,490,291

**CLASS 5**

8 5,490,292
83.1 5,490,293
413 5,490,294
451 5,490,295
601 5,490,296
5,490,297
611 5,490,298
654 5,490,299

**CLASS 8**

404 5,490,865
549 5,490,866

**CLASS 15**

1.51 5,490,300
183 5,490,301
210.1 5,490,302
230.11 5,490,303

**CLASS 16**

82 5,490,304
229 5,490,305
250 5,490,306

**CLASS 19**

239 5,490,308

**CLASS 24**

90.1 5,490,309

**CLASS 29**

27 C 5,490,307
243.5 5,490,310
243.523 5,490,311
243.525 5,490,312
275 5,490,313
401.1 5,490,314
527.7 5,490,315
564.4 5,490,316
564.7 5,490,317
596 5,490,318
5,490,319
623.1 5,490,320
623.2 5,490,867
625 5,490,323
714 5,490,321
722 5,490,322
830 5,490,324
846 5,490,325
876 5,490,326

**CLASS 30**

28 5,490,327
43.92 5,490,328
49 5,490,329
140 5,490,330
143 5,490,331
161 5,490,332

**CLASS 33**

199 R 5,490,333
613 5,490,334
810 5,490,335

**CLASS 34**

97 5,490,336

**CLASS 36**

119 5,490,337
137 5,490,338

**CLASS 37**

94 5,490,339
301 5,490,340

**CLASS 40**

587 5,490,342

**CLASS 42**

70.08 5,490,343

**CLASS 43**

17.5 5,490,344
42.39 5,490,345
42.4 5,490,346
42.47 5,490,347
44.93 5,490,348
122 5,490,349

**CLASS 44**

328 5,490,872
331 5,490,863
379 5,490,864

**CLASS 47**

40.5 5,490,350
56 5,490,351
58 5,490,352

**CLASS 49**

64 5,490,353
352 5,490,354

**CLASS 51**

295 5,490,878

**CLASS 52**

29 5,490,355
167.7 5,490,356
220.7 5,490,357
235 5,490,358
506.06 5,490,359
533 5,490,360
578 5,490,361
582.1 5,490,362
604 5,490,363
637 5,490,364
704 5,490,365
713 5,490,366
749.1 5,490,367

**CLASS 53**

234 5,490,368
317 5,490,369
428 B1 5,195,299

**CLASS 55**

503 5,490,868

**CLASS 56**

11.9 5,490,370
17.2 5,490,371
33 5,490,372
41 5,490,373
400.21 5,490,374

**CLASS 57**

263 5,490,375

**CLASS 60**

39.06 5,490,376
5,490,380
39.12 5,490,377
39.23 5,490,378
39.281 5,490,379
274 5,490,381
297 5,490,382
327 5,490,383
5,490,384
368 5,490,385
660 5,490,386
734 5,490,387
737 5,490,388
5,490,389

**CLASS 62**

9 5,490,390
38 5,490,391
91 5,490,392
101 5,490,393
186 5,490,394
187 5,490,395
457.2 5,490,396
474 5,490,397
497 5,490,398
510 5,490,399

**CLASS 68**

23.3 5,490,400
198 5,490,401

**CLASS 70**

39 5,490,402
202 5,490,403
210 5,490,404
366 5,490,405

**CLASS 72**

30.1 5,490,406
57 5,490,407
256 5,490,408
458 5,490,409

**CLASS 73**

9 5,490,410
12.13 5,490,411
23.31 5,490,412
40 5,490,413
40.5 R 5,490,419
49.2 5,490,414
64.47 5,490,415
82 5,490,416
118.2 5,490,417
161 5,490,418
504.02 5,490,420
514.33 5,490,421
514.34 5,490,422
728 5,490,424
745 5,490,425
762 5,490,426
767 5,490,427
861.41 5,490,428
862.324 5,490,430
862.331 5,490,431
863.83 5,490,429
865.9 5,490,432

**CLASS 74**

348 5,490,433
475 5,490,434
552 5,490,435
573 F 5,490,436

**CLASS 75**

10.14 5,490,869
255 5,490,870

**CLASS 81**

22 5,490,437
53.11 5,490,438
469 5,490,439

**CLASS 83**

599 5,490,440

**CLASS 84**

609 5,491,297
656 5,491,298

**CLASS 91**

338 5,490,441
445 5,490,442

**CLASS 92**

27 5,490,443
71 5,490,444
155 5,490,445
157 5,490,446

**CLASS 95**

23 5,490,871
45 5,490,884
160 5,490,873

**CLASS 96**

204 5,490,874

**CLASS 99**

286 5,490,447
305 5,490,448
330 5,490,449
337 5,490,450
420 5,490,451
422 5,490,452
495 5,490,453
510 5,490,454

**CLASS 100**

50 5,490,455

**CLASS 101**

35 5,490,456
170 5,490,457
375 5,490,458
423 5,490,459
424 5,490,460
483 5,490,461

**CLASS 102**

202.12 5,490,462
439 5,490,463

**CLASS 105**

422 5,490,464

**CLASS 106**

208 5,490,875
213 5,490,876
668 5,490,877
709 5,490,889

**CLASS 108**

51.3 5,490,465
96 5,490,466
133 5,490,467

**CLASS 109**

80 5,490,468

**CLASS 110**

245 5,490,469

**CLASS 111**

186 5,490,470

**CLASS 114**

61 5,490,471
90 5,490,472
260 5,491,302
330 5,490,473
343 5,490,474

**CLASS 116**

217 5,490,475
5,490,476

**CLASS 117**

43 5,490,477

**CLASS 118**

212 5,490,879
665 5,490,880
723 E 5,490,881

**CLASS 119**

28.5 5,490,478
51.01 5,490,479
57.9 5,490,480
259 5,490,481

**CLASS 123**

47 R 5,490,482
65 P 5,490,483
184.49 5,490,484
190.4 5,490,485
198 F 5,490,486
399 5,490,487
570 5,490,488
630 5,490,489
697 5,490,490

**CLASS 124**

44.5 5,490,491
5,490,492
78 5,490,493

**CLASS 126**

41 R 5,490,494
104 R 5,490,495
414 5,490,496

**CLASS 128**

200.14 5,490,497
203.12 5,490,498
203.28 5,490,499
204.13 5,490,500
204.17 5,490,501
204.23 5,490,502
205.12 5,490,503
207.17 5,490,504
633 5,490,505
5,490,506
5,490,523
653.1 5,490,507
653.2 5,490,509
5,490,513
653.5 5,490,508
660.01 5,490,511
660.07 5,490,510
661.01 5,490,512
662.02 5,490,521
662.05 5,490,522
696 5,490,515
774 5,490,516
5,490,517
5,490,518
842 5,490,519
5,490,525
848 5,490,520
849 5,490,524

**CLASS 131**

280 5,490,526
5,490,527

**CLASS 132**

200 5,490,528
218 5,490,529
311 5,490,530

**CLASS 134**

1 5,490,882
3 5,490,883
30 5,490,894
109 5,490,531

**CLASS 135**

117 5,490,532
145 5,490,533

**CLASS 137**

1 5,490,534
219 5,490,535
315 5,490,536
5,490,537
357 5,490,538
486 5,490,539
625.17 5,490,540

**CLASS 138**

118.1 5,490,541
140 5,490,542

**CLASS 139**

383 A 5,490,543

**CLASS 141**

1 5,490,544
319 5,490,545
346 5,490,546
359 5,490,547

**CLASS 144**

356 5,490,548

**CLASS 148**

241 5,490,908
564 5,490,885
637 5,490,886

**CLASS 149**

2 5,490,887
37 5,490,888

**CLASS 150**

167 5,490,549

**CLASS 152**

193 5,490,550
556 5,490,551

**CLASS 156**

66 5,490,896
73.1 5,490,891
89 5,490,892
230 5,490,893
286 5,490,895
345 5,490,896
415 5,490,897
540 5,490,898
552 5,490,899
555 5,490,900
643.1 5,490,901

**CLASS 157**

1.24 5,490,552

**CLASS 160**

84.06 5,490,553

**CLASS 162**

109 5,490,902
111 5,490,903
168.2 5,490,904
212 5,490,905

**CLASS 164**

437 5,490,554
454 5,490,555

**CLASS 165**

26 5,490,556
54 5,490,557
104.33 5,490,558
148 5,490,559
173 5,490,560

**CLASS 166**

264 5,490,561
267 5,490,562
297 5,490,563
374 5,490,564
379 5,490,565

**CLASS 169**

26 5,490,566
50 5,490,567

**CLASS 173**

42 5,490,568

**CLASS 174**

36 5,491,299
151 5,491,300
250 5,491,301
262 5,491,303
264 5,491,304

**CLASS 175**

61 5,490,569
228 5,490,570
323 5,490,571

**CLASS 178**

19 5,491,305

**CLASS 180**

65.1 5,490,572
68.1 5,490,573
5,490,574
270 5,490,575

**CLASS 181**

106 5,491,306
213 5,491,307
224 5,491,308
285 5,491,309
286 5,491,310

**CLASS 184**

55.2 5,490,576

**CLASS 187**

252 5,490,577
254 5,490,578
266 5,490,579
281 5,490,580
414 5,490,581

**CLASS 188**

2 R 5,490,582
161 5,490,583
164 5,490,584

**CLASS 192**

4 A 5,490,585
89.23 5,490,586

**CLASS 193**

35 A 5,490,587

**CLASS 194**

317 5,490,588

**CLASS 198**

444 5,490,589
502.4 5,490,590
803.13 5,490,591
812 5,490,592

**CLASS 200**

4 5,491,311
61.54 5,491,312
310 5,491,313
313 5,491,314
504 5,491,315

**CLASS 202**

172 5,490,906

**CLASS 203**

29 5,490,907

**CLASS 204**

192.15 5,490,910
5,490,911
298.02 5,490,912
298.12 5,490,914
298.18 5,490,915
298.2 5,490,913
452 5,490,909

**CLASS 205**

143 5,490,917
775 5,490,916

**CLASS 206**

157 5,490,593
315.4 5,490,594
408 5,490,595
439 5,490,596
575 5,490,597

**CLASS 208**

131 5,490,918
262.1 5,490,919

**CLASS 209**

401 5,490,598

**CLASS 210**

112 5,490,920
149 5,490,921
159 5,490,922
169 5,490,923
257.1 5,490,924
321.69 5,490,925
321.74 5,490,926
321.84 5,490,927
380.3 5,490,928
430 5,490,929
443 5,490,930
500.23 5,490,931
541 5,490,932
603 5,490,933
614 5,490,934
620 5,490,935
636 5,490,936
637 5,490,937
651 5,490,938
652 5,490,939
671 5,490,940
673 5,490,941
700 5,490,942

**CLASS 211**

171 5,490,599
187 5,490,600

**CLASS 212**

275 5,490,601

**CLASS 216**

56 5,490,602

**CLASS 219**

121.13 5,491,316
121.64 5,491,317
121.67 5,491,318
121.69 5,491,319
137.41 5,491,320
137.61 5,491,321
689 5,491,322
710 5,491,323

**CLASS 220**

4.12 5,490,603
4.34 5,490,604
211 5,490,605
324 5,490,606
483 5,490,607
524 5,490,608
712 5,490,609

**CLASS 221**

2 5,490,610

**CLASS 222**

1 5,490,611
25 5,490,612
102 5,490,613
129.1 5,490,614
153.13 5,490,615
472 5,490,616

**CLASS 223**

61 5,490,617

**CLASS 224**

148 5,490,618
153 5,490,619
160 5,490,620
275 5,490,623
319 5,490,621
556 5,490,622

**CLASS 225**

34 5,490,624
47 5,490,625

**CLASS 228**

44.3 5,490,626
124.1 5,490,627
124.6 5,490,628

**CLASS 229**

403 5,490,631

**CLASS 235**

90 5,491,324
379 5,491,325
381 5,491,326
449 5,491,327
462 5,491,328

**CLASS 239**

119 5,490,632
265.15 5,490,629
309 5,490,630
691 5,490,633

**CLASS 241**

1 5,490,634
101.76 5,490,635
189.1 5,490,636
194 5,490,637

**CLASS 242**

421 5,490,638
525.1 5,490,639
571.6 5,490,640
587 5,490,641
588 5,490,642

**CLASS 244**

3.11 5,490,643
53 B 5,490,644
118.5 5,490,645
134 C 5,490,646

**CLASS 248**

118.1 5,490,647
188.3 5,490,648
214 5,490,649
220.31 5,490,650
222.12 5,490,651
282.1 5,490,652
311.2 5,490,653
316.1 5,490,654
329 5,490,655
352 5,490,656
588 5,490,657
683 5,490,658

**CLASS 250**

205 5,491,329
214 AL 5,491,330
214 VT 5,491,331
221 5,491,332
222.1 5,491,333
227.21 5,491,334
227.25 5,491,335
228 5,491,336
287 5,491,337
307 5,491,338
310 5,491,339
339.06 5,491,340
343 5,491,341
363.09 5,491,342
458.1 5,491,343
461.1 5,491,344
506.1 5,491,345
568 5,491,346

**CLASS 251**

40 5,490,659
96 5,490,660

**CLASS 252**

8.6 5,490,943
8.8 5,490,944
18 5,490,945
47 5,490,946
100 5,490,947
122 5,490,948
174 5,490,949
174.21 5,490,950
182.33 5,490,951
5,490,952
518 5,490,953
550 5,490,954
554 5,490,955
583 5,490,956

**CLASS 256**

13.1 5,490,661

**CLASS 257**

59 5,491,347
66 5,491,348
88 5,491,349
99 5,491,350
152 5,491,351
207 5,491,352
208 5,491,353
239 5,491,354
306 5,491,356
337 5,491,357
373 5,491,359
546 5,491,358
672 5,491,360
680 5,491,361
712 5,491,362
715 5,491,363
751 5,491,365
754 5,491,355
786 5,491,364

**CLASS 261**

29 5,490,957
112.1 5,490,958

**CLASS 264**

2.6 5,490,959
5,490,960
6 5,490,961
22 5,490,962
36 5,490,964
237 5,490,965
318 5,490,966
322 5,490,967
400 5,490,963

**CLASS 267**

49 5,491,669
74 5,490,662

**CLASS 269**

32 5,490,663
66 5,490,664
303 5,490,665

**CLASS 270**

5 5,490,666

**CLASS 271**

225 5,490,667

**CLASS 273**

55 B 5,490,668
72 R 5,490,669
138 A 5,490,670
176.4 5,490,671
187.2 5,490,672
220 5,490,673
228 5,490,674
287 5,490,675
294 5,490,676
351 5,490,677
426 5,490,678

**CLASS 277**

65 5,490,679
170 5,490,680
235 B 5,490,681
815 5,490,682

**CLASS 279**

75 5,490,683

**CLASS 280**

47.11 5,490,684
47.38 5,490,685
247 5,490,686
250.1 5,490,687
655 5,490,688
728.2 5,490,689
5,490,690
735 5,490,691

**CLASS 283**

81 5,490,692

**CLASS 285**

92 5,490,693
305 5,490,694

**CLASS 290**

53 5,491,366

**CLASS 292**

1.5 5,490,695
92 5,490,696
5,490,697
138 5,490,698
341.16 5,490,699
357 5,490,700

**CLASS 294**

61 5,490,701
97 5,490,702

**CLASS 296**

19 5,490,703
24.1 5,490,704
24.2 5,490,705
68.1 5,490,706
95.1 5,490,707
97.8 5,490,708
122 5,490,709

**CLASS 297**

162 5,490,710
186 5,490,711
188.12 5,490,712
217.3 5,490,713
267.1 5,490,714
310 5,490,715
423.12 5,490,716
452.41 5,490,717
452.49 5,490,718

**CLASS 299**

37.4 5,490,740

**CLASS 301**

5.1 5,490,719
35.62 5,490,720

**CLASS 303**

116.4 5,490,721

**CLASS 307**

106 5,491,367
113 5,491,368

**CLASS 310**

26 5,491,369
54 5,491,370
58 5,491,371
80 5,491,372
235 5,491,373

**CLASS 312**

237 5,490,722
334.28 5,490,723
334.45 5,490,724

**CLASS 313**

318.02 5,491,374
409 5,491,375
495 5,491,376
506 5,491,377
5,491,378
509 5,491,379
533 5,491,380
589 5,491,381

**CLASS 315**

3 5,491,775
17 5,491,382
77 5,491,383
169.3 5,491,384
178 5,491,385
209 R 5,491,386
307 5,491,387
308 5,491,388
371 5,491,389

**CLASS 318**

5 5,491,390
39 5,491,391
376 5,491,392
439 5,491,393
560 5,491,395
563 5,491,394
632 5,491,396
696 5,491,397
725 5,491,398

**CLASS 320**

61 5,491,399

**CLASS 322**

28 5,491,400

**CLASS 323**

273 5,491,401
282 5,491,402
5,491,403
283 5,491,404
299 5,491,405

**CLASS 324**

71.1 5,491,408
115 5,491,406
174 5,491,407
212 5,491,413
242 5,491,409
248 5,491,410
5,491,411
251 5,491,412
307 5,491,414
322 5,491,415
393 5,491,416
402 5,491,417
5,491,418
418 5,491,419
435 5,491,420
452 5,491,421
636 5,491,422
663 5,491,423
715 5,491,424
754 5,491,425
5,491,426
5,491,427

**CLASS 326**

17 5,491,428
27 5,491,429
30 B1 5,272,396
B1 5,338,979
33 5,491,430
38 5,491,431
39 5,491,433
86 5,491,432

**CLASS 327**

50 5,491,434
55 5,491,435
108 5,491,436
5,491,437
144 5,491,438
157 5,491,439
172 5,491,440
291 5,491,441
295 5,491,442
391 5,491,443
525 5,491,444
540 5,491,445
551 5,491,446
552 5,491,452
553 5,491,453

**CLASS 330**

149 5,491,454
253 5,491,455
254 5,491,447
264 5,491,448
269 5,491,449
277 5,491,450

**CLASS 331**

3 5,491,451
57 5,491,456

**CLASS 332**

103 5,491,457
144 5,491,458

**CLASS 335**

306 5,491,459

**CLASS 337**

70 5,491,460

**CLASS 338**

32 R 5,491,461
128 5,491,462

**CLASS 340**

310.01 5,491,463
425.5 5,491,464
442 5,491,465
467 5,491,466
522 5,491,467
572 5,491,468
825.04 5,491,469
825.310 5,491,470
825.340 5,491,471
825.57 5,491,472
870.01 5,491,473
870.31 5,491,474
933 5,491,475
5,491,476

**CLASS 341**

20 5,491,477
22 5,491,478
58 5,491,479
67 5,491,480
87 5,491,481

**CLASS 342**

42 5,491,482
5,491,483
51 5,491,484
191 5,491,485
357 5,491,486
378 5,491,487

**CLASS 343**

719 5,491,488
779 5,491,489
895 5,491,490

**CLASS 345**

7 5,491,491
8 5,491,492
118 5,491,494
147 5,491,496
157 5,491,497
173 5,491,495
190 5,491,498

**CLASS 347**

47 5,491,499
48 5,491,500
86 5,491,501
87 5,491,502
171 5,491,503
176 5,491,504
203 5,491,505
246 5,491,506

**CLASS 348**

14 5,491,507
16 5,491,508
77 5,491,510
153 5,491,511
321 5,491,512
390 5,491,513
397 5,491,514
401 5,491,515
402 5,491,509
415 5,491,516
581 5,491,517
607 5,491,518
620 5,491,519
625 5,491,520
626 5,491,521
663 5,491,522
699 5,491,523

**CLASS 351**

212 5,491,524

**CLASS 353**

98 5,491,525

**CLASS 354**

86 5,491,526
195.12 5,491,527
225 5,491,528
266 5,491,529
313 5,491,530
410 5,491,532
416 5,491,533

**CLASS 355**

69 5,491,534
200 5,491,539
5,491,540
204 5,491,535
208 5,491,536
245 5,491,537
247 5,491,538
251 5,491,541
260 5,491,542
271 5,491,543
5,491,544
290 5,491,545

**CLASS 356**

4.03 5,491,546
28 5,491,547
73.1 5,491,548
141.2 5,491,549
345 5,491,550
346 5,491,551
360 5,491,552
375 5,491,553
399 5,491,555
445 5,491,556

**CLASS 358**

296 5,491,557
298 5,491,558
299 5,491,559
342 5,491,560
5,491,561
5,491,562
405 5,491,563
429 5,491,564
468 5,491,565
472 5,491,566
498 5,491,567
518 5,491,568

**CLASS 359**

3 5,491,569
7 5,491,570
59 5,491,571
110 5,491,572
5,491,573
5,491,574
137 5,491,575
156 5,491,576
194 5,491,577

208 5,491,578
241 5,491,579
247 5,491,580
341 5,491,581
5,491,582
356 5,491,583
443 5,491,584
449 5,491,585
530 5,491,586
641 5,491,587
676 5,491,588
895 5,491,589

**CLASS 360**

19.1 5,491,590
35.1 5,491,591
59 5,491,592
73.03 5,491,593
73.04 5,491,594
75 5,491,595
96.5 Re.35,155
97.03 5,491,596
104 5,491,597
106 5,491,598
5,491,599
113 5,491,600
5,491,605
5,491,606
137 5,491,607

**CLASS 361**

79 5,491,601
228 5,491,602
234 5,491,603
278 5,491,604
685 5,491,608
686 5,491,609
695 5,491,610
736 5,491,611
760 5,491,612
784 5,491,614
800 5,491,613

**CLASS 362**

23 5,491,615
35 5,491,616
96 5,491,617
147 5,491,618
294 5,491,619
346 5,491,620
397 5,491,621

**CLASS 363**

56 5,491,622
60 5,491,623
87 5,491,624

**CLASS 364**

133 5,491,625
401 5,491,626
413.2 5,491,627
419.08 5,491,628
420 5,491,629
424.04 5,491,631
424.05 5,491,632
5,491,633
424.1 5,491,630
426.02 5,491,634
431.1 5,491,635
432 5,491,636
468 5,491,637
474.37 5,491,638
488 5,491,639
5,491,640
491 5,491,641
509 5,491,642
512 5,491,643
514 R 5,491,644
516 5,491,645
526 5,491,646
551.02 5,491,647
565 5,491,648
579 5,491,649
606 5,491,650
708.1 5,491,651
726 5,491,652
784 5,491,653

**CLASS 365**

156 5,491,654
177 5,491,655
185.16 5,491,658
185.27 5,491,657
185.29 5,491,656
189.03 5,491,662
189.05 5,491,663
189.09 Re.35,154
200 5,491,664
201 5,491,665
5,491,666
205 5,491,667
219 5,491,659
230.01 5,491,661
230.02 5,491,660

**CLASS 366**

76.9 5,490,725
152.1 5,490,726
316 5,490,727

**CLASS 367**

35 5,491,668
127 5,491,670
158 5,491,671

**CLASS 368**

10 5,491,672
120 5,491,673

**CLASS 369**

32 5,491,674
44.23 5,491,675
44.28 5,491,676
44.36 5,491,677
59 5,491,678
77.2 5,491,679
112 5,491,680
124 5,491,681
5,491,682
5,491,683
219 5,491,684

**CLASS 370**

7 5,491,685
16.100 5,491,686
5,491,696
17 5,491,687
18 5,491,688
58.1 5,491,689
60 5,491,690
61 5,491,691
85.13 5,491,692
5,491,693
85.4 5,491,694
112 5,491,695

**CLASS 371**

5.1 5,491,697
6 5,491,698
22.1 5,491,699
37.2 5,491,702
37.8 5,491,700
39.1 5,491,701
40.1 5,491,703
5,491,704
43 5,491,705
57.2 5,491,706

**CLASS 372**

25 5,491,707
41 5,491,708
45 5,491,709
5,491,710
49 5,491,711
50 5,491,712
92 5,491,714

**CLASS 374**

7 5,490,728

**CLASS 375**

200 5,491,716
205 5,491,717
5,491,718
213 5,491,719
222 5,491,720
5,491,721
224 5,491,722
267 5,491,723
322 5,491,724
324 5,491,725
333 5,491,713
343 5,491,726
344 5,491,715
354 5,491,531
358 5,491,727
362 5,491,728
376 5,491,729

**CLASS 376**

283 5,491,730
307 5,491,731
313 5,491,732
443 5,491,733

**CLASS 378**

10 5,491,734
15 5,491,735
20 5,491,736
58 5,491,737
71 5,491,738

**CLASS 379**

57 5,491,739
58 5,491,740
59 5,491,741
201 5,491,742
202 5,491,743
215 5,491,744
355 5,491,745
373 5,491,746
433 5,491,747

**CLASS 380**

15 5,491,748
21 5,491,749
5,491,750
25 5,491,751
30 5,491,752

**CLASS 381**

58 5,491,753
63 5,491,754
86 5,491,755
90 5,491,756

**CLASS 382**

128 5,491,757
187 5,491,758
199 5,491,759
203 5,491,760
251 5,491,761

**CLASS 384**

43 5,490,729
147 5,490,730
5,490,731
537 5,490,732

**CLASS 385**

16 5,491,762
24 5,491,763
5,491,764
33 5,491,765
100 5,491,766
123 5,491,767
132 5,491,768
145 5,491,770

**CLASS 395**

2.32 5,491,771
2.35 5,491,772
2.38 5,491,773
2.79 5,491,774
11 5,491,776
110 5,491,493
133 5,491,777
5,491,778
139 5,491,769
140 5,491,779
153 5,491,780
157 5,491,781
159 5,491,782
5,491,783
5,491,784
5,491,795
162 5,491,785
180 5,491,786
181 5,491,816
182.09 5,491,787
182.11 5,491,788
182.21 5,491,794
183.01 5,491,789
183.12 5,491,790
183.13 5,491,791
183.15 5,491,792
183.21 5,491,793
200.03 5,491,797
200.04 5,491,798
200.08 5,491,799
200.09 5,491,796
200.12 5,491,800
200.13 5,491,801
200.18 5,491,802
275 5,491,804
284 5,491,805
287 5,491,803
401 5,491,807
417 5,491,806
427 5,491,808
430 5,491,809
444 5,491,810
471 5,491,811
500 5,491,812
5,491,813
550 5,491,814
5,491,815
600 5,491,817
5,491,818
5,491,819
5,491,820
700 5,491,821
5,491,822
5,491,823
732 5,491,824
775 5,491,825
5,491,826
800 5,491,827
5,491,828
5,491,829
829 5,491,830

**CLASS 400**

223 5,490,733
582 5,490,734
614 5,490,735

**CLASS 401**

40 5,490,736
122 5,490,737
208 5,490,738

**CLASS 402**

79 5,490,739

**CLASS 405**

128 5,490,741
157 5,490,742
266 5,490,743
303 5,490,744

**CLASS 406**

132 5,490,745

**CLASS 408**

123 5,490,746
227 5,490,747

**CLASS 410**

64 5,490,748
103 5,490,749

**CLASS 411**

55 5,490,750
368 5,490,751

**CLASS 414**

280 5,490,752
498 5,490,753
537 5,490,754
550 5,490,755
619 5,490,756
680 5,490,757
792.3 5,490,758

**CLASS 415**

10 5,490,759
68 5,490,760
90 5,490,761
168.1 5,490,762
206 5,490,763

**CLASS 416**

239 5,490,764

**CLASS 417**

2 5,490,765
63 5,490,766
222.1 5,490,767
356 5,490,768

**CLASS 418**

1 5,490,769
27 5,490,770
104 5,490,771

**CLASS 419**

2 5,490,968
68 5,490,969

**CLASS 420**

424 5,490,970

**CLASS 422**

58 5,490,971
64 5,490,972
186.04 5,490,973
197 5,490,974
300 5,490,975

**CLASS 423**

210 5,490,977
658.5 5,490,976

**CLASS 424**

49 5,490,978
66 5,490,979
94.6 5,490,980
194.1 5,490,981
401 5,490,982
405 5,490,983
436 5,490,984
450 5,490,985
451 5,490,986
464 5,490,987
5,490,988
484 5,490,989
486 5,490,990
488 5,490,991
606 5,490,992

**CLASS 425**

126.1 5,490,772

**CLASS 426**

92 5,490,993
262 5,490,994
531 5,490,995
548 5,490,996
573 5,490,997
589 5,490,998
633 5,490,999

**CLASS 427**

113 5,491,000
162 5,491,001
249 5,491,002
255.3 5,491,003
393.4 5,491,004
576 5,491,005

**CLASS 428**

13 5,491,006
17 5,491,007
34.2 5,491,008
35.7 5,491,009
5,491,010
36.7 5,491,011
40 5,491,012
5,491,013
156 5,491,014
167 5,491,015
198 5,491,016
5,491,017
200 5,491,018
213 5,491,019
215 5,491,020
217 5,491,021
224 5,491,022
349 5,491,023
373 5,491,025
395 5,491,026
401 5,491,027
408 5,491,028
423.1 5,491,029
433 5,491,030
458 5,491,031
461 5,491,032
537.1 5,491,033
606 5,491,034
647 5,491,035
5,491,036
674 5,490,514

**CLASS 429**

49 5,491,037
91 5,491,038
192 5,491,039
5,491,040
212 5,491,041

**CLASS 430**

108 5,491,042
110 5,491,043
5,491,044
200 5,491,045
302 5,491,046
329 5,491,047
347 5,491,048
379 5,491,049
380 5,491,050
496 5,491,051
545 5,491,052
549 5,491,053
551 5,491,054
567 5,491,055
569 5,491,056
584 5,491,057
596 5,491,058
618 5,491,059

**CLASS 431**

153 5,490,773
154 5,490,774
187 5,490,775
215 5,490,776
344 5,490,777
349 5,490,778

**CLASS 433**

81 5,490,779
93 5,490,780
116 5,490,781
167 5,490,782

**CLASS 434**

35 5,490,783
55 5,490,784

**CLASS 435**

6 5,491,060
5,491,061
5,491,062
5,491,063
5,491,064
7.1 5,491,065
7.25 5,491,067
7.32 5,491,068
7.4 5,491,066
18 5,491,069
25 5,491,071
28 5,491,072
69.1 5,491,073
69.7 5,491,074
5,491,075
70.1 5,491,076
118 5,491,077
168 5,491,078
172.3 5,491,079
5,491,080
5,491,081
176 5,491,082
181 5,491,083
189 5,491,084
192 5,491,085
194 5,491,086
200 5,491,087
240.24 5,491,088
240.46 5,491,090

**CLASS 436**

1 5,491,091
5,491,092
71 5,491,093
125 5,491,094
518 5,491,095
5,491,096
5,491,097
525 5,491,098

**CLASS 437**

35 5,491,099
41 5,491,100
43 5,491,101
52 5,491,102
5,491,103
5,491,104
54 5,491,105
107 5,491,106
162 5,491,107
192 5,491,108
195 5,491,109
206 5,491,110
209 5,491,111
225 5,491,112
5,491,113
233 5,491,114

**CLASS 438**

1372 5,491,024

**CLASS 439**

76.1 5,490,785
79 5,490,786
5,490,787
83 5,490,788
101 5,490,789
141 5,490,790
159 5,490,791
5,490,792
164 5,490,793
212 5,490,794
266 5,490,795
5,490,796
276 5,490,803
310 5,490,797
5,490,798
489 5,490,799
567 5,490,800
585 5,490,801
752 5,490,802

**CLASS 440**

38 5,490,804

**CLASS 441**

75 5,490,805

**CLASS 446**

48 5,490,806

**CLASS 451**

3 5,490,807
59 5,490,808
60 5,490,809
165 5,490,810
239 5,490,811

**CLASS 452**

138 5,490,812

**CLASS 454**

306 5,490,813

**CLASS 455**

33.1 5,491,831
5,491,832

5,491,833
33.2 5,491,834
34.1 5,491,835
38.5 5,491,836
62 5,491,837
66 5,491,838
5,491,839

**CLASS 474**
92 5,490,814

**CLASS 477**
181 5,490,815

**CLASS 482**
3 5,490,816
46 5,490,817
52 5,490,818
55 5,490,823
60 5,490,824
74 5,490,825
5,490,826

**CLASS 493**
109 5,490,827
220 5,490,828
419 5,490,829

**CLASS 494**
14 5,490,830

**CLASS 498**
194 B1 4,286,007

**CLASS 501**
4 5,491,115
5 5,491,116
13 5,491,117
20 5,491,118

**CLASS 502**
74 5,491,119
304 5,491,120

**CLASS 503**
200 5,491,121

**CLASS 504**
100 5,491,122
104 5,491,123
139 5,491,124
206 5,491,125
228 5,491,126

**CLASS 505**
433 5,491,127

**CLASS 514**
11 5,491,128
12 5,491,129
13 5,491,130
14 5,491,131
18 5,491,132
44 5,491,133
114 5,491,134
115 5,491,135
172 5,491,136
182 5,491,137
5,491,138
192 5,491,139
212 5,491,140
214 5,491,141
5,491,142
5,491,143
245 5,491,144
247 5,491,147
248 5,491,145
261 5,491,146
305 5,491,148
307 5,491,149
310 5,491,150
311 5,491,151
336 5,491,152
339 5,491,153
356 5,491,154
362 5,491,155
367 5,491,156
369 5,491,157
5,491,158
374 5,491,159
384 5,491,160
394 5,491,161
403 5,491,162
411 5,491,163
423 5,491,164
479 5,491,165
481 5,491,166
510 5,491,167
517 5,491,168
529 5,491,169
538 5,491,170
558 5,491,171
602 5,491,172
648 5,491,173

**CLASS 521**
126 5,491,174
137 5,491,175
159 5,491,176
5,491,177

**CLASS 522**
74 5,491,178

**CLASS 523**
136 5,491,179
139 5,491,180
200 5,491,181
206 5,491,182
404 5,491,183
436 5,491,184
451 5,491,185

**CLASS 524**
13 5,491,186
159 5,491,187
229 5,491,188
259 5,491,189
322 5,491,190
576 5,491,191

**CLASS 525**
7.4 5,491,192
65 5,491,193
66 5,491,194
71 5,491,195
237 5,491,196
332.8 5,491,197
340 5,491,198
362 5,491,199
419 5,491,200
420 5,491,201
438 5,491,202
474 5,491,203
523 5,491,204

**CLASS 526**
121 5,491,205
126 5,491,206
129 5,491,207
143 5,491,208
320 5,491,209

**CLASS 528**
28 5,491,210
60 5,491,211
363 5,491,212
480 5,491,213
483 5,491,214

**CLASS 530**
212 5,491,215
303 5,491,216
313 5,491,217
387.3 5,491,218
391.1 5,491,219
399 5,491,220

**CLASS 534**
618 5,491,221

**CLASS 536**
18.7 5,491,223
22.1 5,491,224
24.32 5,491,225
115 5,491,226
124 5,491,227

**CLASS 540**
128 5,491,228
450 5,491,230
456 5,491,229
5,491,231

**CLASS 544**
3 5,491,232
174 5,491,233
325 5,491,234

**CLASS 546**
57 5,491,235
101 5,491,236
116 5,491,237
270 5,491,238
345 5,491,239

**CLASS 548**
347.1 5,491,240
452 5,491,241
455 5,491,242

**CLASS 549**
75 5,491,243
561 5,491,244

**CLASS 554**
68 5,491,245

**CLASS 556**
7 5,491,246
113 5,491,247
173 5,491,248
460 5,491,249
466 5,491,250

**CLASS 558**
431 5,491,264

**CLASS 560**
23 5,491,251
26 5,491,252
27 5,491,253
121 5,491,254
126 5,491,255
132 5,491,256

**CLASS 562**
41 5,491,257
538 5,491,258
554 5,491,259
567 5,491,260
582 5,491,261

**CLASS 564**
330 5,491,262
369 5,491,263

**CLASS 568**
347 5,491,265
449 5,491,266
647 5,491,267
758 5,491,268

**CLASS 585**
15 5,491,269
467 5,491,270
468 5,491,271
520 5,491,272
639 5,491,273
655 5,491,274
659 5,491,275
671 5,491,276
719 5,491,277
731 5,491,278

**CLASS 588**
201 5,491,279
202 5,491,280
207 5,491,281
261 5,491,282

**CLASS 600**
201 5,490,819

**CLASS 601**
41 5,490,820
134 5,490,821

**CLASS 602**
16 5,490,822
26 5,490,831
37 5,490,832

**CLASS 604**
4 5,490,833
21 5,490,836
22 5,490,840
96 5,490,837
5,490,838
5,490,839
110 5,490,841
5,490,842
164 5,490,843
266 5,490,845
366 5,490,846
387 5,490,847
403 5,490,848

**CLASS 606**
5 5,490,849
45 5,490,850
61 5,490,851
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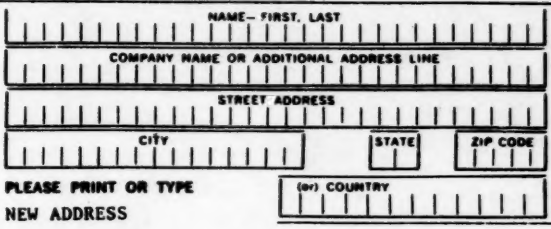


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